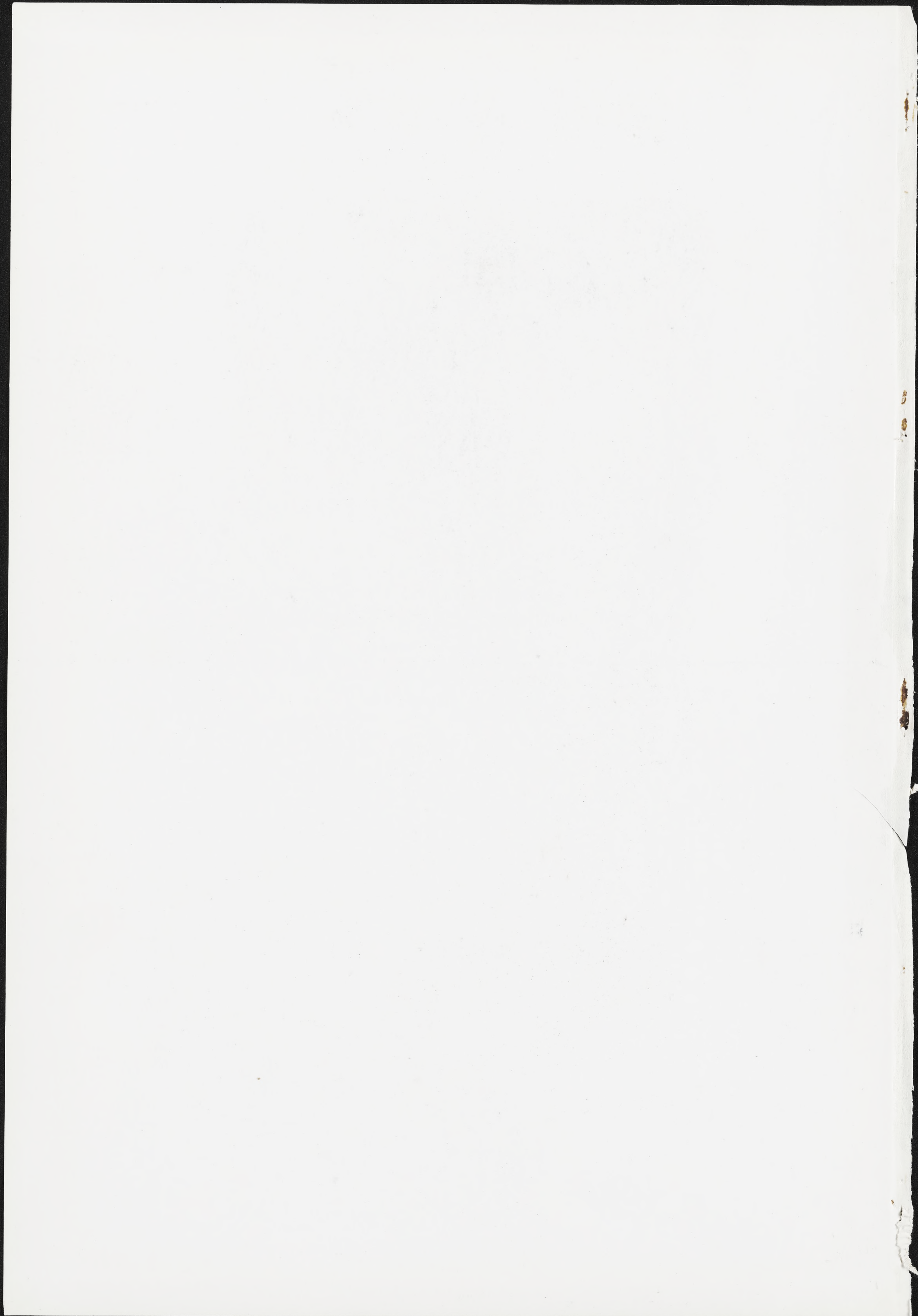


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NORTHROP NEWS

NORTHROP VENTURA

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January 19, 1966

Highway 101 Offramp Bids Due in May

Bids will be advertised in May for construction of the proposed new offramp leading more directly to Northrop Ventura, according to Earl L. Thomas, senior highway engineer, California Highway division.

Mr. Thomas said that two weeks are then generally required for award of a construction contract.

He estimated the project could be completed by the end of 1966 or early 1967.

The new offramp will permit entry into Rancho Conejo Boulevard directly from the right side of the road, instead of after a stop, from the left as required at present.

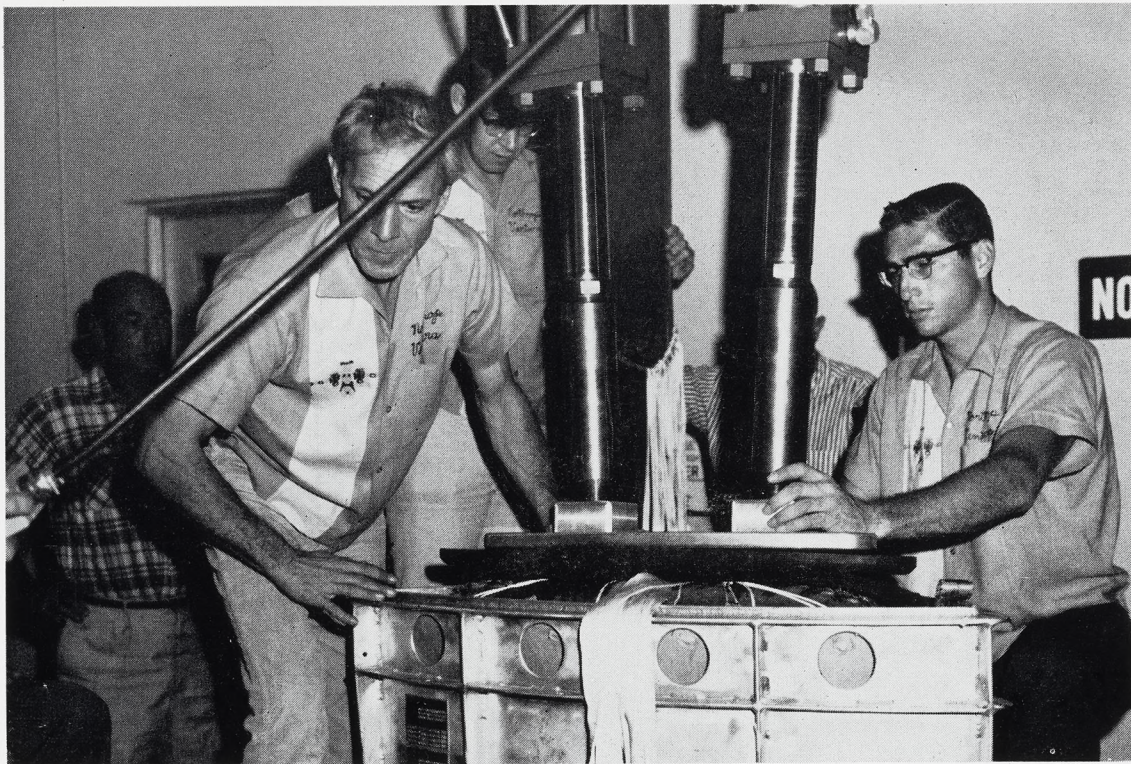
Many people working within Newbury Park have been turning left off Highway 101 at Ventu Park Road to avoid the Rancho Conejo Road traffic jam at the stop sign.

The proposed offramp is the first step in a long range plan to form a complete cloverleaf at the Borchard Road-Rancho Conejo Boulevard interchange with Highway 101, Mr. Thomas has indicated.

Construction has already begun on an interchange and overpass at Ventu Park Road.

Mr. Thomas told H. E. Riggins, vice president, Administration, and Frank Tipton, Corporate assistant legal counsel, Northrop Ventura, that Highway 101 will be widened to an eight lane freeway from Calabasas to Conejo within two years.

Both Mr. Riggins and Mr. Tipton have been working with state officials toward improving conditions at the Newbury Park offramp.



YOU MEAN THERE'S MORE?—Apollo riggers of Northrop Ventura (from left) Taswell Payne, Don Severs and Larry Richardson, thrust 85-foot canopy and cordage of a main chute for Spacecraft 009 into tapered packing can with help of a 30-ton hydraulic ram. Packing at Kennedy Space Center is for unmanned launch scheduled this year. (NASA photo).

State-of-the-Art Pushed to Highest Limits To Meet Parachute Packing Requirements

Parachute packing — whether it's a 28-foot personnel chute or an entire landing system for a returning spacecraft—is an exacting task.

But the stringent requirements for Apollo parachutes have pushed the state-of-the-art boundaries to their highest limits.

For example, each of three Apollo main parachutes is pressed into its deployment bag by dual hydraulic rams, together exerting up to 30 tons of pressure on the nylon fabric of canopies and suspension lines. The procedure is performed with the aid of a vacuum pump reducing the air pressure within a reinforced aluminum container which supports the deployment bag during packing.

When the job is completed, the density of the main chute package is about the same as that of a block of maple wood, 42 pounds per cubic foot.

Each 85-foot canopy and its cordage fits into an irregularly shaped package, about 2 feet square at its base, 2 feet high, and tapering in a wedge from the bottom to a 1½-foot top edge.

Since 1954 the Northrop Ventura Apollo Project office has faced changing requirements of reduced space for the parachute system versus an increased load it must support in the final leg of Apollo's return trip.

As successful packing procedures were developed the massive pressures necessary were found to

border on the regions where portions of nylon cloth would burn and melt as two areas rubbed together.

The shape of the final package had much to do with this situation.

The nylon cloth and cordage had to be pushed into the narrowing packing container. So felt and rubber pads were strategically placed between the parachute and the ram pressure plates.

Particular attention was paid to the shape of the plates and their position in relationship to the parachute and packing can.

The lining material within the deployment bag was changed as well to reduce friction as the canopy and cordage were compressed, step by step, into their eventual wedge shape.

It takes about 27 hours to get a single main chute into its deployment bag. It is then sealed under vacuum in double plastic covers for protection and shape retention until used.

Chute packing is now performed at three locations, Northrop Ventura, Newbury Park; Cape Kennedy, and at the El Centro Field Test branch.

Apollo drogue and pilot chutes are prepared, under less pressure than is required for the main chutes, in the Northrop Ventura parabolab, headed by Ted Szostek.

Head rigger at Ventura is Jim Colunga, who has been readying parachutes for their users since 1956.

Mr. Colunga reports a feeling of confidence in any of the Gemini or Apollo parachutes he works on.

"Parachute packing," he said, "is a job we have to do just as anyone else has their job to do."

"I have a feeling of responsibility as part of an important program like Apollo or Gemini. (See PARACHUTES, page 6)

J. D. Willson Named Top Finance Exec

James D. Willson, Financial vice president of Tidewater Oil Company, has been named Northrop Corporate vice president—Finance, and chief financial officer, it was announced last month by Thomas V. Jones, Northrop president and chairman.



Mr. Willson

Mr. Willson had been with Tidewater Oil Company since 1959 and prior to that was vice president of Finance of the Norris-Thermador Corporation.

He has had a broad background in the financial, control and planning functions of industry and is the co-author of two books on corporate finance, "Controllanship" published in 1963, and "Business Budgeting and Control" published in 1956.

In 1959 he received the Lybrand Gold Medal Award from the National Association of Accountants for outstanding contribution to accounting literature. He has also published several articles on improved managerial concepts in finance and accounting.

He joined Northrop earlier this month.

DOD Consolidates Administration of Military Contracts

Responsibility for administration of Department of Defense contracts awarded by the three military departments and the Defense Supply Agency to Northrop Ventura shifted recently.

A new Contract Administration Services District located at Van Nuys now holds prime responsibility for this function.

This district office, one of several to be formed under the Los Angeles Region, Defense Contract Administration Services, was created as part of a nationwide plan to consolidate field offices of the military departments and the Defense Supply Agency.

The consolidation aims at improving management and operations through the establishment of uniform policies, procedures and organization. It provides defense contractors with a single point of contact with the Department of Defense, a lessening of governmental control over industrial operations, and a uniform application of regulations to defense contractors.

Activities to be performed by the Van Nuys District office include pre-award surveys of contractor capabilities; quality assurance; security clearances for plant and personnel; payments to contractor; and similar functions required by the government during the production of defense material.

ENTHUSIASM IS CONTAGIOUS

Ben Sumner, the Philanthropic Philatelist

What do you do when you live in a neighborhood where the youngsters seem to be standing around the streets without much to do?

Ben Sumner, a designer at Northrop Ventura, saw this problem on his block and for a while he thought he had no answer in sight.

It was with some curiosity that he noticed a youngster standing around near the house one day holding a small piece of paper in his right hand. What's up, Ben wondered, and he approached the boy.

"What have you got there, young man?" Ben asked.

The boy held out a dirty, torn stamp. "This is my stamp collection," he said.

Ben had some stamps in his desk that he had collected at odd moments, so he invited the boy into the house.

"His eyes popped out," Ben said, "when he saw the stamps

and he was even more impressed when I offered him some of them.

"You can pick out any ten of these and keep them for your collection," I told him. He picked some out and the next day he brought his young cousin over for some stamps. I knew I had helped this boy. He wouldn't be standing around with nothing to do any more."

Since that day, Ben has given away thousands of stamps to boys and girls as incentive for them to start collections.

A girl at a junior high school in the San Fernando Valley wrote that she was preparing a stamp display for her seventh grade project. She was specializing in South American stamps and wanted to know if Ben had anything suitable to add to her project.

Ben sent her a packet including an expensive Colombian stamp depicting the Miss Universe beauty contest winner from that coun-

try. Later the junior high school miss reported that her collection had won first place in her class.

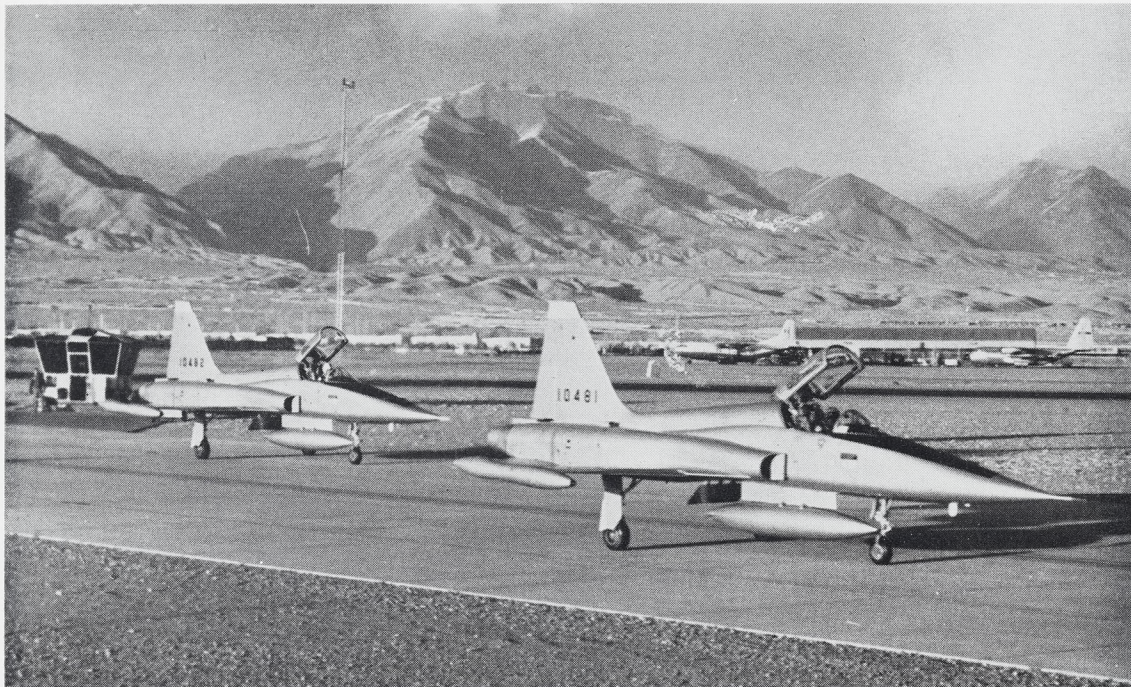
Many of the youngsters Ben assists are children of employees or of students he teaches at Los Angeles City College. He teaches machine design classes in evening sessions at LACC.

In some cases, he reports, the parents also become stamp enthusiasts, starting their own collections alongside their children.

His list of young stamp-collecting pen pals numbers about 100 most of the time, with the names changing as time passes. Ben gives out the stamps according to the child's interest and state of advancement, getting most of the stamps off of the letters of friends.

So any person who wants to send Ben Sumner postage stamps of almost any description for an obviously worthy project can reach him at 8949 Langdon Avenue, Apt. 1, Sepulveda, California 91343.

FOUR F-5'S FLY 11,000 MILES



Four new Northrop F-5's were delivered to the Imperial Iranian Air Force in Teheran late last month in the longest aerial delivery to date and the first under the Military Assistance Program. The aircraft were ferried 11,000 miles from Williams AFB, Arizona, by the 441st combat crew

training squadron. Last October, a squadron of 12 F-5's made a 9000-mile deployment to South Vietnam. Northrop management representative at Williams, Hank Waklee, says goodbye to Captain Billy B. Gilbert, USAF.

Warrick Heads AIA Committee Session

Gil Warrick, Northrop's supervisor of government reports, served last month as national chairman of the Aerospace Industries Association's Government Reports Committee meeting held in Tucson, Arizona.

Mr. Warrick is currently national chairman of this committee which includes representatives from the Department of Defense, NASA, Air Force, Army and Navy as well as major aerospace firms.

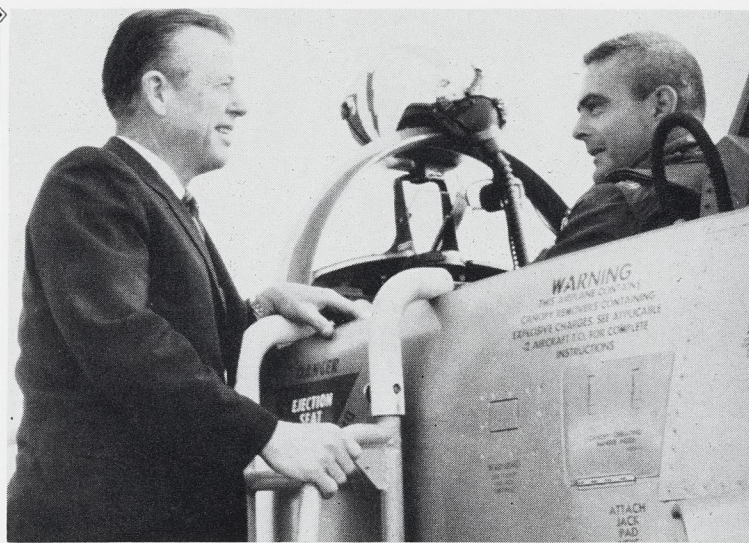
The Tucson meeting, held December 7-8 at the Desert Inn, drew 70 participants who concentrated on various problems related to business control systems involving reports submitted to governmental agencies.

Dr. Fallis Organizing Aerospace Session

Dr. William B. Fallis, project chief of Hypersonic and Lifting Entry Project at Northrop Norair, has been named a session organizer for the first AIAA West Coast Aerospace Sciences meeting to be held in Los Angeles June 27-29, 1966.

Dr. Fallis' session is on entry vehicles.

The Aerospace Sciences meeting, which also covers such subjects as atmospheric environment, astrodynamics, and atmospheric flight mechanics, is planned to be similar to the annual January meeting in New York.



CRAIG, MUNSEN, BAGBY CHAMPS IN CHRISTMAS GOLF TOURNAMENT

Mike Craig, Bob Munsen and Bob Bagby were over-all winners of first, second and third flights in the all-Northrop Christmas golf tournament held December 27-28.

Played on consecutive days over the Los Verdes and Harding courses, the event drew 120 par chasers representing all Northrop divisions in the area.

Mr. Craig's 69-70-139 net total was one stroke better than the 140s posted by Dick Geer and Bob Pratt and the 142 logged by Virgil Wilson.

Mr. Munsen's net 137 in the second flight was followed by a three-way tie between Ted Fujimoto, Tut Kadowaki and C. Willett, all with 141s.

Dick Teel and A. Weddell tailed Mr. Bagby's 143 in the third flight with 144s, with Lou Villalba posting a 145.

Individual round winners were not allowed to garner prizes for two days, but were eligible for over-all laurels.

Mr. Wilson, Mr. Geer, Lou Drazin and Mr. Craig finished in that order in the first flight at Los Verdes. In the second flight the placings were Mr. Willett, Mr. Kadowaki, Charles Chamberlin and Bill Mahlman. Mr. Weddell, Bob Sanders, Mr. Teel and Matt Peckham placed in that order in the third flight.

At Harding, Tom Williams, Rollie Pierce, Ted Hallett and Joe Seman finished in that order in the first flight. Mr. Munsen, Mr. Fujimoto, Ray Freed and T. Gentle, took honors in the second flight respectively, while Mr. Bagby, Mr. Villalba, Charles Oppenlander and Joe Kalina placed in that order in the third flight.

AD ASTRA PER ASPERA

Mock Contract Negotiation To Explain Complexities

By the Northrop News Staff

One of the most unusual, educational—and perhaps entertaining—programs ever staged by a defense aerospace-oriented professional society is scheduled February 4 by the National Contract Management Association at the Airport Marina Hotel in Los Angeles.

Industry and government contract representatives are going to sit down at a conference table and actually negotiate a mock government contract, with an expected 400 partisans looking on.

The day-long meeting is an educational conference designed to present the "latest and best knowledge regarding the negotiation of changes and terminations to multiple incentive contracts."

NCMA put on a similar program in 1964 at which a multiple incentive contract (MIC) was negotiated.

This year's event will see a moderating panel negotiate changes and terminations to that same contract.

Northrop's Dan Harnett, Corporate director of Contracts and Pricing, will join Howard W. Neffner, Boeing vice president, and Colonel H. A. Budd, Air Force Ballistic Systems Division, or the panel, which is headed by Brigadier General Joseph E. Bleymaier of Air Force Western Test Range.

According to Mr. Harnett, the Department of Defense and National Aeronautics and Space Administration are continuing a major emphasis on multiple incentive contracting.

MIC allows for a greater profit by a contractor for his performance in several areas, such as performance, cost savings, and schedule.

Launched in 1960 as an experiment by the DOD, MIC is "a way of life today," Mr. Harnett said. NCMA is only a year older than MIC, but has mushroomed in membership and professional stature in a short time.

One good reason for its growth is its educational conferences, such as the one next month, which come at a time when contract negotiations are more complex and critical than ever before.

The hypothetical case, by the way, was developed by Donald L. Somers, of Peat, Marwick,

Livingston and Co. A contracts and planning consultant, Mr. Somers also developed the case which was presented by NCMA in 1964.

—C. R.

THEY'D WALK A MILE FOR A \$3 SCR

It's been over two months now, but seven engineers at Nortronics Palos Verdes are still looking for \$3 SCR's.

What's an SCR? It's a silicon control rectifier. It fits into an electronic subsystem known as an automotive transistorized ignition kit.

It's supposed to make the points, spark plugs and gasoline in your car last longer.

The men have bought most all the components for their kits except the SCR's. They could order the part for \$18, but it seems one of the guys found one for \$3. Now the rest believe they can do as well so the hunt is on.

If anybody's got four or five \$3 SCR's on hand they don't need, call Mike Long, John Lefingwell, Herb Stark, Don Marden, Jerry Mandel, John Crowley, or Dick Flude. They may give you as much as \$3.25.

Meanwhile, Ken Barlow, who bought his SCR with the original kit, has the only working transistorized ignition of its type on the block at Number One Research Park.

—B. S.

AND IN CONCLUSION...

John Hill of Norair's Manufacturing Engineering presented a paper on "Cold Forming of Titanium and Similar Metals Using Polyurethane" to the Plastics Tooling Division of the Society of Plastics Industry in Los Angeles. He has been asked to give the paper again in March when the 23d annual conference of the SPI Western Section convenes in Palm Springs. Lois Paris, secretary in Manufacturing R&D, is serving her second elected term as secretary to the SPI's Plastics for Tooling Division, Western Section.

The Journal of the Society of Photo-optical Instrumentation Engineers contains an article by Nortronics' Walter M. Clark, senior engineer at Palos Verdes. Mr. Clark's paper, presented orally to the 10th SPIE technical symposium last August, is on photometric standards.

Certain aspects of Norair's lifting body research vehicle studies will be described in a paper authored by M. S. Cahn, J. R. Stevens, G. M. Andrew and J. R. Garcia, next week at the AIAA third Aerospace meeting in Los Angeles. C. R. Hall will discuss boundary layer research at the same meeting. Northrop Ventura will contribute a paper on Apollo Recovery System Dynamic Analysis by R. E. Eriksen, Dr. Morrie Neustadt, Joe Guiteras and J. A. Larrivee.

Northrop Space Laboratories' Huntsville facility is sending Dr. Steve Hu and M. L. Thompson who will present a paper on optimal spaceflight guidance functions.

IN CHRISTMAS EVENT

Norair, Nortronics Keglers Divide Most Laurels

Honors were about evenly divided between participants representing Norair and Nortronics December 11-12 in the all-Northrop Christmas Bowling tournament sponsored by NRC.

Only one Northrop Ventura man, Tony Piscuskas, was able to break into the top ranks from among the small entry from that division.

Frank Blair, Ron Beye and Bud Wegnes, all Norair, placed in that order in the men's "A" singles event. The "B" event

found honors going to Drex Carlson of Nortronics, Mr. Piscuskas, James Billings and Ron Kelley, both Norair, respectively.

Mickey Tomblin and Flo Oehler of Norair Palmdale placed one-two in the women's "A" singles followed by Sylvia Pearson, also of Norair. Dona Smith and Jean Arrasmith of Nortronics took first and second in the "B" singles trailed by Betty Stolz of the same division.

Mrs. Arrasmith and John Meyer team for "A" doubles hon-

ors, followed in order by Bud Wegnes and Nancy Fujikami (Norair), Eli Cowdray and Ann Lichney (Norair-Nortronics), and Bill Myerson and Elaine Dower (Norair-Nortronics).

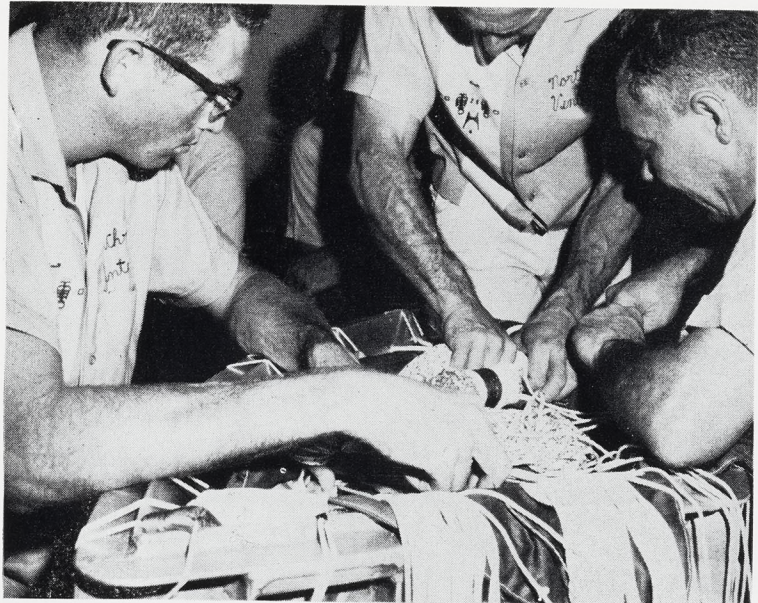
Mixed "B" doubles fell to Nortronics' Lew Lantz and Marge Lantz, followed by Norair's Ron Kelley and Carmela Moniello and Tom Weaver and Oliver Weaver of Nortronics.

Del Young and Robert Kocher of Nortronics copped men's doubles "A" honors, followed by two

Norair teams composed of Frank Blair and Earl Guisinger, George Fujikami and Bud Wegnes, and the Nortronics entry of R. C. Dopf and R. Arrasmith.

Men's "B" doubles went to Norair's Orville Call and Herb Ripley trailed by Howard Hill and Norm Norfjor of the same division. Nortronics' Stan Apo and Alan Gytoky and Lew Lantz and Loren McAnelly finished third and fourth.

Nancy Fujikami and Donna (See BOWLING, page 5)



(5) Flaps together



(6) Pack closure



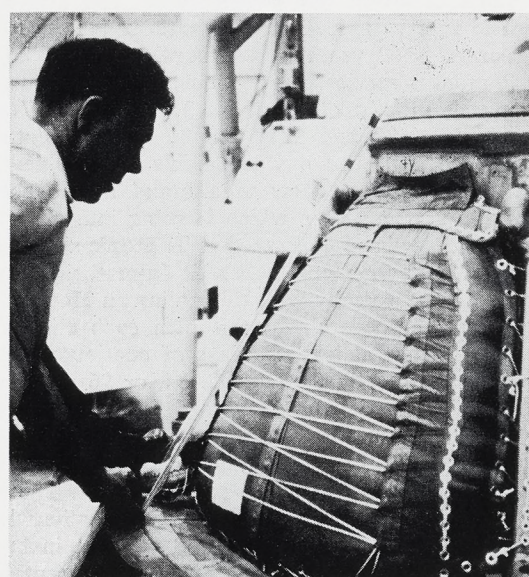
(7) Reefing cutter check



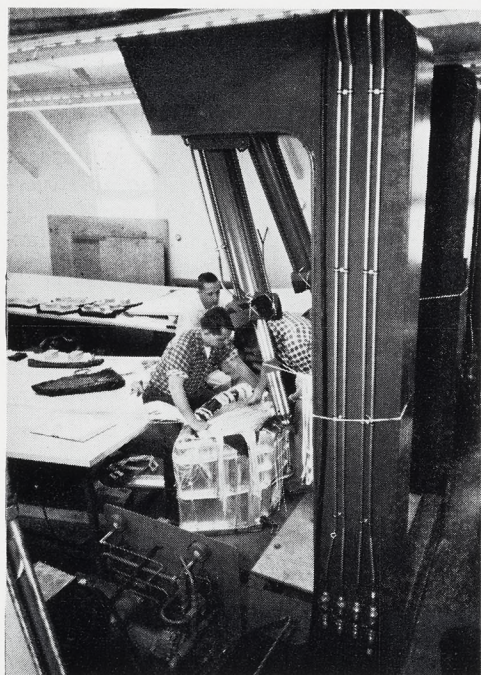
(4) Reefing line splice



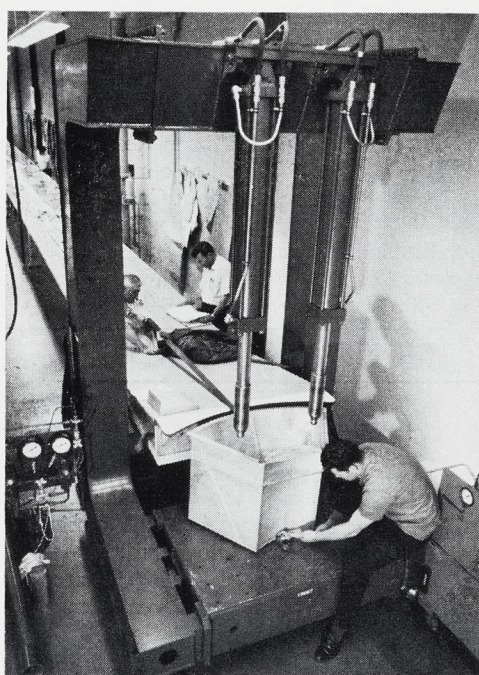
(3) Weigh in



(8) Ready to go



(2) Risers in



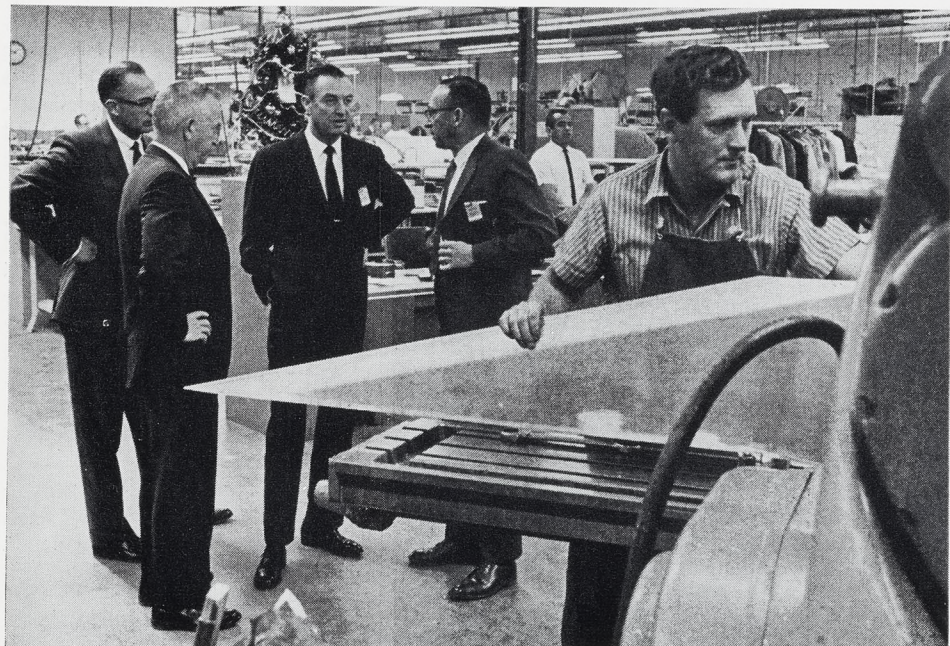
(1) Can ready

APOLLO PACKING SEQUENCE

Main parachutes for Apollo earth landing system are packed by procedure that took more than three years to develop. Photo sequence, roughly clockwise, reveals the work of skilled Northrop Ventura packers. (1.) Main canopy stretches along packing table ready to be pressed into can by twin 30,000-pound rams. From left, Clarence Bennett, Woody Stone and Chuck Kennedy get set. (2.) Specially developed pressure plates for ram lie on tables near Dick Cary, Wendell Shaw and Orrin Reed. (3.) Completed pack is weighed to double check that nothing that shouldn't be inside is inside. From left are Elmer Newsome of Bendix, John Simpson and Bill Downs, at Kennedy Space Center. (4.) Taswell Payne splices ends of reefing lines. (5.) Folding of flaps before lace-up is carried out by (from left) Larry Richardson, Taswell Payne and Mr. Downs. (6.) Critical step is pack closure and involves (from left) Orville Reed, Northrop Ventura base administrator of El Centro Test Facility, Mr. Cary, and Charles Stiles, with Ned Druihet learning procedure. (7.) If Hal Warren (right) feels cord move as Moe Avena pulls, than none of reefing cutters have fired. Cord runs through in front of each cutter blade. (8.) Mr. Downs checks pack installed on boilerplate for test that occurred late in 1965 (photos by NASA, Northrop Ventura).



Members of Junior Achievement firm, Custom Craft, sponsored by Nortronics Hawthorne, have panoramic view of F-5 and T-38 production lines during recent tour of Northrop Norair.



Both Nortronics and Ventura divisions were hosts to a brief tour of facilities by Northrop President and Chairman Thomas V. Jones just before the holiday vacation. He had a "hello" for Ron Harrison (left photo), who is here shaping a wing for one of Ventura Division's target drones, while M. A. Maurer, vice president—Production briefs Mr. Jones on Production activities. At left is H. E. Riggins,



vice president—Administration, and George Douglas, Corporate vice president and Ventura general manager. At Anaheim (right photo), Mr. Jones chats with Bill Gramm, at right, foreman of Mechanical Assembly and Test branch, and Nick Niccole, superintendent of Assembly and Test branch. Grant Gunderson, chief of the Production group, is at left.

FRINGE BENEFITS

Hourly Personnel Get Savings Plan



By WILLIAM LARRABEE
Vice President—Industrial Relations

Now that the holidays are over and we are back to work, it's time to start talking again about our Northrop fringe benefits.

You will remember that in the last article on this subject we covered a new phase of our early retirement program known as the "Magic 85" formula. It will be recalled that generally speaking under this formula if an eligible person's age plus his length of continuous service equals 85 he can retire early with his full benefit earned to the time of his actual retirement, and that if he falls short of 85 points, his earned benefit is reduced by only two and one-half percent for each point he is short.

A good many people have inquired as to whether parts of years count in this computation. The answer is that they do. The year is divided into 12 parts under the formula. Hence, if a person is 62 years plus 6 months old and he has 22 years plus 2 months service, he will have his 85 points. If he is 61 years plus 2 months old and has 21 years plus 7 months service, he will have 82 and 9/12 points. The full details of the formula will be published just as quickly as possible.

Let us go on now to a brand new benefit for our eligible hourly-rated people which is going into effect as of February 1, 1966. Northrop believes that its people should have every chance and encouragement to benefit from their own individual efforts and in conformity with this policy an Hourly Savings Plan is being established. Under this plan each eligible hourly-rated employee with at least 30 days of continuous service may authorize payroll deductions of \$2, \$4, or \$6 per week.

These funds are forwarded by the company to the trustee under the plan, the Manufacturers Hanover Trust Company in New York, and are invested by the trustee. The individual involved may specify whether he wishes his deductions invested 100 percent in bonds or 50 percent in common stocks. The trustee is not permitted to invest any employee money in Northrop stock. The company matches the employee's contributions with 50 cents for each employee dollar. This 50 percent company contribution is invested by the trustee only in Northrop stock. The company pays the expenses of administration of the trust over and above its 50 percent contribution.

When an employee's connection with the company is severed for any reason, he becomes entitled immediately to receive the value of his own contributions as computed under the plan. Hopefully, with such good investment service as is provided by the trustee, he will have a profit. In addition, if his severance is

(See FRINGE BENEFITS, page 5)



Mr. Miller

HAWAIIAN ADVENTURE



These 94 Northrop employees and families joined in the yearend holiday trip to Hawaii sponsored by Northrop Recreation Club. Tours of Maui, Hawaii, Kauai and Oahu

islands were included in the visit, and a grand time was had by all, according to Jeanne Andrecht, Travel Club commissioner at Nortronics.

Medicare Benefits to Be Available In July Through Social Security

Northrop Corporation employees who have already observed their 65th birthday are being urged to apply for their benefit rights by the Social Security Administration.

Those 65 or over at the beginning of 1966 are eligible to receive new "Medicare" benefits beginning July 1, 1966, even though they continue to work.

However, each individual must apply for these benefits through the Social Security Administration prior to March 31, 1966.

To assist eligible individuals, and especially those who are currently employed, the Social Security offices in the greater Los Angeles area have arranged special evening hours of operations. This convenient service is being provided from 5:30 to 8:30 p.m. each Wednesday by the area offices which include those at:

Inglewood, 608 E. Manchester Blvd.; Los Angeles, 419 South Hill St.; Torrance, 1408 Crenshaw

Blvd.; Santa Monica, 1514 Sixth St.; Van Nuys, 4631 Van Nuys Blvd.; and Santa Ana, 1438 East First Street. These and other Social Security offices are open Monday through Friday from 8:30 a.m. to 4:30 p.m.

The Long Beach office, located at 1235 Pacific Ave., will remain open Thursday evenings from 4:45 to 6:45 p.m.

The Ventura office, at 4274 Telegraph Road, will be open from 5:30 to 8:30 p.m. on both Wednesday and Thursday evenings.

No evening hours have been scheduled by the Lancaster office.

Northrop employees desiring additional help or who have questions on Social Security or the Northrop Retirement Plan are invited to contact the following Retirement Counselors: David Cocks at Norair; Betty Albright at Northrop Ventura; or Harry Belcher at Northrop Nortronics (Anaheim).

World Tour Planned For 33 Days in Fall

Reservations are now being accepted at Personnel Activities offices for an NRC-sponsored "around-the-world" tour next fall.

Departing September 2, the 33-day excursion will include visits to Hawaii, Japan, Hong Kong, Bangkok, India, Pakistan, Lebanon, Jordan, Egypt, Turkey, Greece and the Greek Islands.

Total cost is \$1495.

Travel Clubs Sponsor Junket to Mexico

Reservations are now being accepted at Northrop Personnel Activities offices for a 15-day tour of Mexico departing April 29 under joint sponsorship of NRC Travel Clubs.

The tour will include stops at Mexico City, Xochimilco, Cuernavaca, Taxco, Acapulco, Guadalajara, Puerto Vallarta, and Mazatlan.

Total cost is \$320 per person.

BUT IT'S THE WOOD TAPPING THAT COUNTS

Joe Rashid Family Has the World on a String

Violin making is an ancient art, more than 400 years old, but even in this age of expanding technology the old names like Stradivarius still stand for the best in stringed instruments.

The variables in violin making, according to Joe Rashid, are such that it is extremely difficult to include the desired acoustic characteristics in an instrument.

Mr. Rashid, who recently began work as an engineering specialist in the Thermal Structures and Propulsion group at Northrop Space Laboratories, has been playing and making violins for 33 years. A Northrop employee since 1947, he had been at Nortronics Palos Verdes the last five years.

Not only is it difficult to produce good stringed instruments, he reports, but it is almost as hard merely to match the characteristics of an older violin of respected quality.

"One of the required techniques," Mr. Rashid explained, "is to avoid trying to duplicate exactly the thicknesses of the wood in the older violin. It's more important to compare the vibration frequencies of each piece with the disassembled parts of the successful instrument."

"By tapping a violin top and

back along two selected axes I can evaluate the acoustics. As I work the wood I can compare the new parts with those of an older violin I know is a good instrument."

Testimony to the success of his theory is the attitude of Detroit Symphony Concert Master Joseph Gingold.

Mr. Gingold used one of the Rashid violins in the orchestra and when his offer to buy the in-

strument was declined, the conductor permitted Mr. Rashid to make copies of his 1683 Stradivarius.

Mr. Rashid started duplicating the rare old instrument by carefully measuring its physical dimensions.

When work was begun on the duplicates, he applied his acoustical technique, shaping and cutting the spruce front and maple

back until the resonances were matched as closely as his ear would permit.

In this manner he has produced several copies of the 282-year-old violin.

Mr. Rashid had to provide his own violin making tools, since none of the special tools required are manufactured. Using a hard wood known as lignum vitae he has prepared miniature planes, a whole set of which will fit in

his palm.

The final carving of the carefully selected wood requires half-moon shaped steel blades about three inches across prepared by him. The violin patterns also were made by him.

His cello was played in the Los Angeles Philharmonic by the first desk cellist, Nino Rosso, during a broadcast concert. World-famed Gregor Piatigorsky has played it on several occasions and pronounced it "excellent".

A viola made by him received high praise from the renowned violinist, William Primrose.

The five Rashids, Joe, his wife, Lee; Robert, 15; Carol, 14; and Billy, 11; all play one stringed instrument or another in chamber music concerts at home. Lee Rashid, who was a professional violinist in Springfield, Massachusetts, plays the viola, Robert the cello, and the two younger children the violin.

Robert has won a first prize in a contest for strings and when he was only 11, joined the Beach Cities Symphony, to which Mr. Rashid also belongs.

Carol is concert mistress of the Dodson Junior High School orchestra, and Billy is concertmaster of the Crestwood School orchestra.



Stringed instruments run in the family, according to Joe Rashid of NSL, who has made some 20 of them in 33 years. Watching him start spruce front of another violin



In left photo are his son, Billy, 11, and daughter, Carol, 14, who also play chamber music at home with brother, Robert, 15, and Mom, Mrs. Lee Rashid.

To place an ad in the Northrop News, obtain classified ad form C67 from your organization clerk and mail the ad to Northrop News, 170, Beverly Hills.

Classified

Deadline is noon Wednesday, one week before publication. Ads are limited to one item. The Northrop News reserves the right to edit or omit ads.

For Sale
Volkswagen , 1963, radio, w/s/w, many other extras, low mileage, \$1395. San Pedro, TE 1-2654. A
Australian Silky Terriers , champion sired, AKC reg., no odor or shedding, shots, \$150. Inglewood, PL 7-1640. A
VW 1200 sedan , 1964, 22,500 miles, windshield washers, heater, \$1250. L.A., 476-1635. A
House , 4-bdrm., family room, 2½ baths, 1 acre, horses OK, near Northrop Ventura, \$35,000. Somis, 805-482-1186. A
Cemetery Lot , Inglewood Park, Sunrise sec., \$450. Inglewood, 674-5579. A
International Travelall , 1963, V-8, H-D 5-spd. trans., air conditioning, r/h, 21,000 miles, many extras, \$2195. P.V., 377-1075. A
House , 4-bdrm., 1770 sq. ft., 3-yrs. old, \$36,500. Torrance, 327-2666. A
Ski Boots , boy's size 3, dble., \$10. Norco, 735-1232. A
Vacuum , Kenmore Magicord w/powermate rug attach., powermate has own elec. driven motor for rotary beater-sweeper action, 1-yr-old, \$50. Hawthorne, 676-6122. A
Ford Tudor , V-8, 1951, \$75. Downey, TO 9-2673. A
Exercycle , \$300. Brea, 529-3531. A
Range , top grill, burners & 2 ovens, Western Holly, \$85. Hermosa Bch., FR 9-7342. A
Tape Recorder , all-transistor battery operated, \$9.90. Hawthorne, 676-0418. A
Ford coupe , 1948, 283 Chevrolet eng., new interior, \$1100. Torrance, FR 8-1350. A
Receiver w/speaker , NC-300, 160-10 meter, headphones & manual, \$160. San Pedro, TE 3-9696. A
Clothes Dryer , new heating element, \$30. Long Bch., 596-1280. A
Stove , O'Keefe & Merritt, griddle, auto. oven timer, sep. adjustable broiler, \$65. Manhattan Bch., 379-2649. A
Lamp Set , table-type, modern, \$20. Inglewood, OR 3-1189. A
Drafting Machine , Bruning-Wallace, upper arm 30", lower arm 24", \$40. Redondo Bch., FR 6-6415. A
Ford , 1951 Custom 4-dr., r/h, good tires, new battery, elec. safety door locks, \$100. Redondo Bch., FR 5-3914. A
Ski Boat & trailer , 14' fibreglass over plywood, 50 h.p. Mercury eng., elec. starter, speedometer, ski hook, night lights, \$450. Torrance, FR 1-1125. A
Ford , 1950, Starliner, 427, tri-power-4-spd., many extras, \$1200. Torrance, 324-8789. A
Lathe , Powerkraf Logan, 10"x24" w/milling attach., chucks, & large assort. of related tools, \$175. Arcadia, 446-1887. A
Fiat , 1953 Topolino, convt. coupe, 4-cyl., o/head valve, \$500. Riverside, 689-7678. A
Metropolitan , 1955, \$175. Torrance, FA 8-3041. A
Bicycle , boy's 26" Schwinn med. weight, \$13. Torrance, FA 8-3306. A
Buick Skylark , 1962, 2-dr. h/top, b/s, p/s, p/b, r/h, factory air cond., 1-owner, approx. 35,000 miles, \$1595. Torrance, FR 8-4301. A
Ford , 1957, sta. wag. 9-pass. r/h, Fordo., new tires, battery, \$210. L.A., 756-0015. A
Camera , Leica 3C w/f. 2.0 Summar lens, Steinheil 135 mm tele. lens, cowhide cases, \$75. Costa Mesa, 714-546-5341. A
VW Sundial camper , 1966, split seats, AM/FM radio, complete, 2500 miles, \$3150. Redondo Bch., FR 5-2156. A
Piano , restyled upright w/mirror, walnut, \$150. Fullerton, LA 5-5868. A
HO Train Set , \$85. Anaheim, 714-KE 5-6296. A
Mercury , 1955, 2-dr., all power, \$125. Torrance, DA 4-8663. A
House , 2-bdrm., dining room, fireplace, dble. garage, \$21,750. Inglewood, OR 1-3860. A
Cemetery Lots , dble. interment, Inglewood Park, El Portal sec., \$800. P. V. Pen., 377-1180. A
Thunderbird , h/top, 1959, \$1050. Redondo Bch., 374-7956. A
Ford wagon , V-8, 1954, auto. trans., r/h, \$175. L.A., 254-9964. A
Chevrolet , 1956, new auto. trans., r/h, \$115. Playa del Rey, 391-8072. A
172 Flying Club , no initiation, \$25 mo. plus \$6 hr. wet rate. L.A., VE 7-9813. A
Buick , 4-dr. Roadmaster, r/h, p/s, p/b, \$275. Buena Pk., LA 1-4711. A
VW , 1965, w/sun roof, radio & seat belts, low mileage, \$1685. Long Bch., 633-5938. A
House , 2-bdrm., h/wood floors, interior recently painted, patio w/built in barbeque, consider lease w/option to buy, \$16,000. Torrance, FR 1-0629. A
Barbecue , portable, w/electric, spit & hood, \$5. Torrance, DA 5-5245. A
Chevrolet , Super Sport cpe., 1964, V-8, auto. trans., p/b, p/s, p/w, new tires & brakes, \$2200. Hawthorne, OS 5-6831. A
Surfboard , Rick, 9'4", \$95. Lomita, DA 6-6214. A
Pontiac , 1959 4-dr., \$425. Torrance, 329-8406. A
Valiant , 1961, 4-dr., big 6, r/h, auto. trans., 26,000 act. miles, orig. owner, \$875. Lawndale, 676-3050. A

For Sale
Mercury , Monterey, 1960, 2-dr., r/h, new w/s/w tires, auto. trans., \$450. Hawthorne, 675-5215. A
Wire Wheels , 2 19", suitable for MG PA, MG J2, MG TC, \$10 ea. Torrance, 375-0449. A
Bicycle , boy's 26", \$5. Lawndale, OS 9-0876. A
Buick Special , 1957, auto. trans., p/s, p/b, \$150. Hawthorne, OS 9-2710. A
Chevrolet , 1958, p/s, auto. trans., V-8 eng., push-button radio, heater, \$577. Hawthorne, 676-4837, 676-9989. A
Plymouth Fury , 1964, 2-dr. h/top, p/s, p/b, r/h, \$1600. Redondo Bch., 374-2915. A
Austin , 1959 Cambrian model, 4-dr. sedan, b/s, 4-spd., low miles, \$350. Gardena, 327-0662. A
Ford Galaxie 500 , 1962, 2-dr., p/s, p/b, r/h, \$1050. Lynwood, NE 5-3824. A
Refrigerator , 1955, 10 cu. ft., copper tone, \$70. Gardena, 679-3927. A
Volkswagen , 1963, 23,000 miles, \$1250. P.V. Estd., FR 5-9985. A
Chevrolet , 1953, convt., stick, r/h, tonneau cover, \$195. Torrance, 327-4585. A
Magnatone custom 480 amp. , w/50 watt stereo guitar amp w/reverb. & echo chamber, Echo Fonic, hvy. duty speakers, 2 12" & 2 6" ovals, \$385. Long Bch., GA 3-0373. A
Freezer , Kenmore, frostless, 6-mos-old, \$175. Hollydale, ME 3-2395. A
Truck Mirrors , 5"x10" Coronado stainless steel, tinted glass, \$10. Gardena, OS 6-3726. A
Record Player , Norelco, \$25. Lynwood, NE 1-9322. A
Honda , 1964, 150 cc, extras, \$350. Lawndale, 675-4305. A
Ford Galaxie 500 s.p., h/top, 36,000 miles, factory air, \$500 equity & take over 15 pymts. of \$63.89. Inglewood, 753-3979. A
Desert Property , 2½ acres near 29 Palms, accessible by roads, ½ mile from 29 Palms Hwy., electricity & phones avail., \$950. Torrance, 378-5922. A
Cadillac , 1941, 4-dr., \$100. Inglewood, OS 5-1558. A
Corvaire Monza , 1962 tudor, air conditioned, r/h, new w/s/w, \$995. Torrance, 329-1293. A
Bicycle , 20" boy's, \$8. Lennox, OR 2-2370. A
Ford pickup truck w/camper , sleeps 4, \$350. Lawndale, 679-8426. A
Ford Station wagon , Fordomatic, p/s, orig. owner, new tires & brakes, 51,900 miles, \$700. Sepulveda, 894-8490. A
Land , 40 acres in Xmas Valley, Ore., level, 7 miles to lodge, \$150 acre or \$5000. Lennox, OR 7-3788. A
Volkswagen , 1961, r/h, extras, \$850. Camarillo, 805-482-6125. A
Wall Heater , dble.-side, gas, 45,000 BTU, \$25. Paramount, ME 0-5562. A
VW 1500S sq. bk. sedan, 1965, r/h, \$1950. Torrance, DA 3-6018. A
VW , 1500S Variant sunroof, 1964, w/s/w, r/h, many extras, \$1925. L.A., 478-5732. A
Rambler , 1958, 4-dr. sedan, new tires, brakes & radiator, r/h, 48,000 miles, \$390. L.A., EX 8-6375. A
T-Bird , 1956, h/top, recent overhaul & paint, good tires, auto. trans., 1-owner, \$1295. Pacific Palisades, 454-2057. A
Mercury Monarch , 1959 2-dr. h/top, \$400. Lawndale, 370-3230. A
Lincoln Premiere , 1956 w/Continental kit, \$175. Harbor City, 326-1409. A
T-Bird convt. , 1961, full power, air conditioning, \$1200. P.V., FR 7-5439. A
MG Midget , 1964, take over 17 pymts. at \$71.78 mo. or \$1400. Box 2301. A
MGA , 1958, r/h, custom top, tonneau & paint, \$950. Playa del Rey, 398-1458. A
MG-B , 1965, wire wheels, o/drive, r/h, tonneau cover, 1-owner, \$2425. Hawthorne, 679-2488. A
Comet , 1962, 4-dr. stnd. shift, new battery, tires, brakes, \$850. Ftn. Valley, 847-0575. A
Dump Truck , 5 yd. bob tail 1957 Chevrolet, \$1700. Thousand Oaks, DI 0-8730. A
House , 2-bdrm, custom, panelled kitchenette, covered patio, 2-car gar., 15'x35' filtered & heated pool, Alcoa alum. siding, corner lot, \$23,500. Lakewood, HA 5-6844. A
Land , Antelope Valley, 5-acre parcels near Willow Springs, \$520 acre, terms. Torrance, FR 8-1026. A
Ski Boots , LaDolomite, dble. boot, men's size 7D w/boot press, \$25. Manhattan Bch., 379-7831. A
Golf Clubs , 1965 Wilson staff irons, 2-9, D-2, reg. shafts, G-grips, \$80. Manhattan Bch., 379-4437. A
Bicycle , Schwinn 8-spd. racer w/generator light & rack, \$45. Long Bch., 433-2202. A
House , 3-bdrm. & den, new kitchen, completely redecorated, lge. fenced yard, fire place, \$17,950. L.A., OR 4-0366. A
Bicycle , Derailleur, 21", 10-spd., Schwinn, \$55. Inglewood, OS 6-0573. A
Bedroom Set , blond, twin beds on frames, chest-of-draws. & large dresser, \$75. L.A., OS 6-9855. A

For Sale
Golf Clubs , Pro-line, matched set, 10 irons & 4 woods, 6-mos-old, \$85. Hawthorne, OS 6-8997. A
Range , Gaffers & Sattler, gas, w/auto. clock timer, \$70. Lakewood, 867-0593. A
Wedding Dress , custom-made, lace o/bridal satin, \$50. Redondo Bch., 370-7213. A
Dining Room Set , table & 6 chairs, \$60. Inglewood, 671-4064. A
Cadillac , 1957, convt., all power, new top good tires & mechanical, \$500. Torrance, 375-1756. A
TV , Zenith, 23", table model w/wheeled stand, VHF plus channel 28, \$65. Pacific Palisades, 454-1963. A
Range , gas, Magic Chef, coppertone, 4-burner, auto. oven & timer, 1-yr.-old, can be built-in, \$175. Redondo Bch., 375-3266. A
Enlarger , 4x5 Federal condenser-type, access. diffusion glass to replace condenser, 2-tongs, 3 hard rubber trays 10"x12", 5-spd. easels, many extras, \$50. Compton, NE 5-3294. A
Bassinet , used 6 wks., large, dressing table top, collapsible legs on rollers, \$10. Long Bch., GA 3-4837. A
Ford station wagon , 1959, air conditioning, r/h, auto, p/s, p/b, w/s/w, other extras, \$495. L.A., 474-3433. A
Motorcycle , 1965, B.M.W. 500 cc, 6000 miles, dble seat, roll bars, luggage rack, & windshield, \$1095. L.A., 939-7834. A
Chevrolet Biscayne , 1961, 6 cyl., stick shift, w/s/w, r/h, seat belts, orig. owner, \$675. Hawthorne, 675-0891. A
Home , 3-bdrm, 1¾ bath, R-2 corner, 20 min. to Northrop, hdwd. floors, F.A. heating, elect. built-ins, disposal, dble. gar., pvt. brick patio, fenced yd., landscaped, newly painted int., \$23,000. Hermosa Bch., 379-1542. A
Television Set , Zenith 1966, color, 21", full factory guarantee, in factory crate, \$329. L.A., OR 0-5950. A
Drapes , 4 panels, orange, 84" wide, \$20. Torrance, TE 5-2128. A
Miscellaneous tools & parts , elec. motors, \$5-\$15. Box 2302. A
Obtain pvt. pilot's license economically as part owner of late model pvt. aircraft, \$250. Manhattan Bch., 379-2649. A
Horse , AQHA filly, 2½-yrs.-old, green broke buckskin, \$550. Torrance, DA 9-2016. A
House Trailer , 1961, 1-bdrm., Pan American penthouse model, terms available, \$4000. Gardena, NE 5-9944. A
Ponies , red stallion, spirited 3-yrs. old, brown mare, lge., & 1 black & white, 4-yrs.-old, plus saddles, \$150. Cypress, 828-6654. A
Chevrolet , 1957, 2-dr. Bel-Aire h/top, chrome wheels, \$400. Lawndale, 371-0680. A

Wanted to Buy
Radio Equipment , Motorola, GE or RCA FM XMTR & REVR. unit w/up to 100 watts output, unconverted 150 to 170 mc equip. acceptable, mobile & base station needed for 2 meters. Whittier, OX 3-4117. B
Reverb. Time Delay Unit , Hammond. Hawthorne, 676-2803. B
Ski Boots , man's 9 or 9½ and/or woman's 7½. Hawthorne, 676-7344. B
Early VW , appearance not important, good mechanical condition. Woodland Hills, 346-6675. B

For Sale
VW Camper , 1962, 28,000 miles, Westphalia model, top rack, 2 fitted tents, \$1550 or trade for VW sedan. Gardena, DA 9-2904. C

FREE (To Be Given Away)
Stove & Refrigerator , older models, Gardena, 323-3245. D

Rentals Offered
Apt , 2-bdrm., 2-bath, deck, sub. garage, dishwasher, all elec., adults, \$175 mo. Inglewood, 373-1143. E
Apt , 1-bdrm., deluxe, built-ins, pool, \$95 mo. Redondo Bch., 376-2117. E
House , 3-bdrm., 2-bath, dble. gar., enclosed yd. w/patio barbeque, stove avail., near school, shopping, \$185 mo. Torrance, 371-5694. E
Duplex , 2-bdrm., near elem. school, 1-car gar., 1-car parking space, stove & refrig., avail. about Feb. 1, \$150. Manhattan Bch., 379-6762. E
Home , 3-bdrm., 1¾ bath, Hollypark, near Northrop, \$185 mo. Gardena, FA 1-3362. E
Apt , 2-bdrm. units, upper & lower, built-in stove & oven, closed gar., soundproofed, near So. Bay shopping center, \$110-\$130. Redondo Bch., 374-5879. E
Apt , 1-bdrm., 1-car gar. space, \$110 mo. Manhattan Bch., 367-6137. E
Room , unfurn., kitchen & living room privileges, 1-mile from ocean, avail. Feb. 15, \$50 mo. Redondo Bch. 374-2433. E
Bachelor Apt , furn., tile bath, lge. closet, utilities paid, 4 short blocks to Northrop, \$16 wk. San Pedro, TE 3-2512. E
Apt , 2-bdrm, unfurn., 2 bath, garage, ocean view, utilities paid, \$150 mo. Manhattan Bch., FR 4-0750. E
Apts , 1, 2, 3 bdrm., furn. or unfurn., pool, pets, children OK, \$125 mo. & up. Marina del Rey, 392-3173. E

Going my way?

Rides Wanted
7:30 a.m. — 4:15 p.m.
Alma & 24th Streets , Manhattan Beach. L. Berg, Norair, ext. 2763, 379-6762. 3

Appian Way & Park , Long Beach. Belmont Shore area. W. S. Coleman, Norair, ext. 2015, 433-0861. 3
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8 a.m. — 4:45 p.m.

LaBrea & Santa Monica Blvd. , Los Angeles. Carl Seybold, Norair, ext. 2276, 876-7419. 5
Coldwater & Sherman Way or Van Owen , No. Hollywood. Arlene O'Connor, NSL, ext. 518, 982-0452. 5

Orange Ave. & Del Amo , Long Beach. W. H. Covert, NSL, ext. 2721, GA 3-1363. 5

Shoup & Victory , Canoga Park. Melvin D. Sadowsky, Norair, ext. 1758, 348-8588. 5
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Rides Offered
7 a.m. — 3:45 p.m.

So. San Diego Fwy. & Westminster Blvd. , Huntington Beach. Will take 3 persons - plant 1 only. Ralph Steele, Norair, ext. 1992, 714-847-5029. 12

7:30 a.m. — 4:15 p.m.

Appian Way & Park , Long Beach. Belmont Shore area. W. S. Coleman, Norair, ext. 2015, 433-0861. 13

LaBrea & Santa Monica Blvd. , Los Angeles. Carl Seybold, Norair, ext. 2276, 876-7419. 15

Coldwater & Sherman Way or Van Owen , No. Hollywood. Arlene O'Connor, NSL, ext. 518, 982-0492. 15
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Orange Ave. & Del Amo , Long Beach. W. H. Covert, NSL, ext. 2721, GA 3-1363. 15
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Shoup & Victory , Canoga Park. Melvin D. Sadowsky, Norair, ext. 1758, 348-8588. 15

BOWLING

(Continued from page 2)

Wegnes (Norair) won women's "A" doubles laurels with Elva Heald and Maggie Craig (Norair) taking second, Flo Oehler and Mickey Tomblin (Norair) placing third. Women's "B" honors fell to Carol Lemberger and Mary Lemberger of Norair, while Eileen Meyer and Jean Arrasmith of Nortronics took second.

Special merit awards went to top performers for the two-day event. Listed below are winners in various events with men's "A" and "B" winners, the women's "A" and "B" winners entered, respectively.

High scratch series, Del Young, Drex Carlson, Flo Oehler and Carol Lemberger; high scratch game, Bud Wegnes, Tom Weaver, Una Lippon and Lucille Kocher.

High handicap series, R. C. Dopf, Conrad Pearson, Elaine Dower and Mary Lemberger; high handicap game, Earl Saunders, Francis Sordelet, Sylvia Pearson and Carmela Moniello.

FRINGE BENEFITS

(Continued from page 4)

due to layoff, retirement, death, or several other factors, he receives the full company 50 percent in Northrop stock. There are some circumstances such as a quit, a termination for cause, or withdrawal of funds which will cause him to lose the last two years of the company contribution. There are provisions for partial or total withdrawal so that the employee can get money out.

Obviously, all of the details of the plan cannot be covered in a short article like this. Copies of the plan have been published and should already be available to everyone. Please read it carefully as it is controlling. Periodic regular saving is just about the best way in the world to assure the future for the individual and his family. When the savings are augmented by the company's 50 percent contribution and the investment services are paid for by the company, the advantages are obvious.

Some other changes are coming up in the savings plan area. Both the new Hourly Savings Plan and the Salaried Savings Plan which had been in effect for sometime provide for changes from one plan to the other in the event the employee's status changes. Furthermore, the Salaried Plan is being amended, effective August 1, 1966, to provide, in substance, that salaried employees who have been continuous participants in the plan for a period of three years may increase their contributions if they so desire to a maximum of eight percent of their salary.

The necessary paperwork will be available to eligible participants prior to that time. The new matters in the savings plan area and other plans that we have been talking about are in process of preparation and submission to the various governmental agencies for approval. No difficulty is anticipated.

For your general information, both savings plans are administered out of the Corporate office by a committee appointed by the company's board of directors. Robert R. Miller, a senior vice president of the company, is chairman of the Savings Plan Administrative committee.

PARACHUTES

(Continued from page 1)

but the responsibility doesn't worry me.

"When I finish my work on a parachute system I'm as sure as anyone can be that the system is going to work. I think everyone here who packs feels the same way."

Mr. Colunga said he worries more about other systems in Apollo or Gemini during a mission than about Northrop Ventura's earth landing system.

El Centro Field Test branch, headed by Orville Reed, packs main chutes of the system, except those which will be used at Cape Kennedy.

When parachute systems are required at the Air Force Eastern Test Range, Carey Buhler, project engineer for Systems Engineering and Analysis, acts as base administrator for Northrop at the Cape.

He takes with him a crew of seasoned parachute riggers, Bill Downs, Taswell Payne, and Mr. Colunga. Larry Richardson, stationed at Cape Kennedy to pack Gemini chutes, also assists on Apollo as necessary.

Systems required for White Sands tests are prepared at Northrop Ventura and by El Centro Field Test branch.

Bill Bjerke is the engineer responsible for design of all fabric portions of the parachute system.

With the Apollo parachute system still in the testing phases, an important task is planning, coordination and control of field test, for which Leon Scrydloff, project engineer, Apollo Test, is responsible.

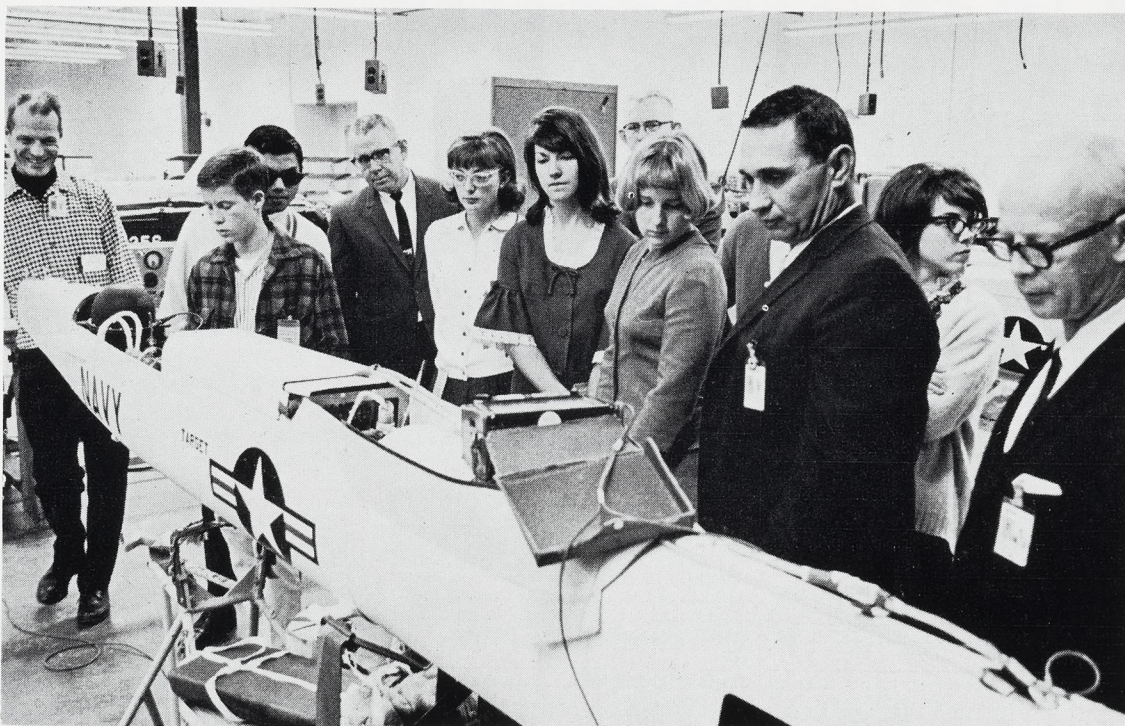
The 100-page document, "Main Parachute, Inspection and Packing Instructions," which guides the riggers in their work, was prepared by John T. Morrison of the Design Engineering branch. Behind its title page lies the accumulated knowledge of more than three years of Apollo parachute system test and development.

Art/Writers Club To Be Launched

Plans for the formation of an Art Club and a writers' Workshop by Northrop Recreation Club were announced this week by Dorothy Prychoda, NVRC secretary.

Further information may be obtained by calling Joan Clark, extension 249.

AND ON YOUR LEFT . . .



Northrop Ventura-sponsored Junior Achievement company gets closeup of KD-2R5 target drone produced at Ventura for the U.S. Navy and allied nations. Members of CONACO, Inc., the youths toured production facilities under the

direction of Buck Gilmore (second from right), production foreman. Art Smith (left) is running tests on drone. J-A counselors in photo are Dick Davis, Walt Knox and Doug Finch.

Two Production Men Advanced

Advancement of two production specialists at Northrop Ventura was announced this week.

Harry McLaughlin, Plastics Production unit supervisor since 1963, became foreman of the Plastics and Metal Bonding branch. Gordon Nelson, transducer production technician at Aero Instrument Facility, was elevated to supervisor of the Transducer Production unit.

Mr. McLaughlin first joined Northrop Ventura in 1959 after having been in plastics since 1953.

His branch manufactures metal bonded detail subassemblies for drones and plastic parts for the T-38 and F-5.

Mr. Nelson has been with Northrop Ventura since 1964, most of that time at Aero Instrument in North Hollywood. At the facility he is in charge of production of the transducer, which utilizes photoconducting cells and moving shutters to produce signals.

New Savings Plan

A new savings plan for hourly personnel is described in this issue by William Larrabee, vice-president—Industrial Relations. See his Fringe Benefits column on page 4.

BETWEEN US VALLEYS, BUS SERVICE IS TOPS

About 140 Northrop Ventura employees have taken to heart the spirit of commercial messages from two major transportation companies, who encourage: "Leave the driving to us" and "The only way to fly!"

These 12 dozen Venturans travel from the San Fernando Valley each morning to the Ventura facility and back again in the evening on buses chartered for them by Northrop Ventura.

Most of the people who work at Ventura know of the arrangement, but few have the details on the comfort and convenience available aboard the Associated Coach Lines vehicles.

For example, there are reclining seats, and reading lights for those morning hours before full light and for the winter period when daylight saving time doesn't save enough daylight for the evening trip home.

The buses are air conditioned and heated, and although motion pictures are not available as on jet airliners, the passengers can listen to soothing music.

At the rear of at least one bus each morning and evening, three or four passengers set up a portable bridge table and enjoy a few

hands of bridge en route.

The valley-to-valley commuters (San Fernando to Conejo) find plenty of parking on the streets at the numerous charter bus stops. They leave their cars for the day and are dropped off at carside in the evening . . . a different sort of "bumper to bumper" commuting than you usually find on the freeways.

For all this highway cruiser comfort, Northrop Ventura charges a nominal weekly fee, enough to cover the costs. Some of the riders claim a saving over using their own cars.

By the way, to sign up for the five day a week charter trip, don't consult your local travel agent. Merely telephone Mrs. Sherry Cable, extension 429, or see her in the Personnel group, Room A-118.

New Dance Club To Offer Lessons

Northrop Venturans will be able to take lessons in the fox trot, samba, tango, cha cha, waltz and other basic dances when the new Dance Club opens its doors.

Further information may be obtained from Bill Fischer, extension 386.

HL-10 Goes To NASA for Flight Tests

Northrop delivered its second lifting body research vehicle, the HL-10, yesterday to National Aeronautics and Space Administration (NASA) at ceremonies held at Northrop Norair.

Thomas V. Jones, Northrop president and chairman, acted as master of ceremonies and officially transferred the vehicle to Paul F. Bickle, director of NASA's Flight Research Center, who will direct its flight test program.

The HL-10 is the second craft of its type delivered to NASA within the past seven months. The M2-F2, delivered in June, has gone through an extensive test program at NASA's Flight and Ames Research Centers and is now awaiting its initial flight. Both vehicles will be used to help solve problems of future manned spacecraft entering the earth's atmosphere.

NASA's Milton Thompson is chief pilot of the flight programs for both vehicles, with Captain Jerauld R. Gentry, USAF, assigned flight responsibilities.

Golfers of the Year To Be Named in '66

A man and woman Golfer of the Year will be named during 1966 by the Northrop Ventura Golf Club, Lil Goodwin, club secretary has announced.

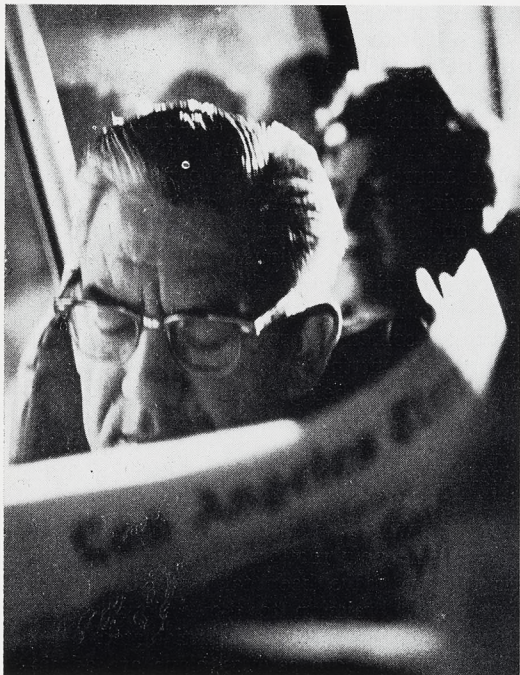
The awards will go to top point scorers based on golf play and service to the club. Trophies will be given.

Points will be awarded to winners of A, B, C and women's flights, and to all tournament participants, as well as to closest-to-the-pin golfers.

In the area of club service, the points will be issued for photographs, news, circulars or other items of interest posted on the bulletin board, as well as to officers for their efforts.

All prize points will be given in addition to the trophies and prizes now presented.

Special events such as putting contests, and longest drive competition will increase point winning opportunities.



ONLY WAY TO FLY—You can't do this kind of relaxing (left photo) if you drive to work from Reseda. Dick Bargman finds it more convenient than driving to get on the Northrop Ventura leased bus at White Oak and Haynes five mornings a week. Bridge players (center photo), from left, Jim Benham, Bonnie Stewart, Kathy Patterson and Earl Clark keep hands on the cards

despite Highway 101 traffic. On the other hand, don't expect this kind of treatment (right photo) every day from Associated Coach Lines driver Bob Krugh, assisting Laura Stump from bus as Lee Recchia prepares to dismount.

NORTHROP NEWS

NORTHROP VENTURA

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February 2, 1966

Negotiations With Chicago Firm Told

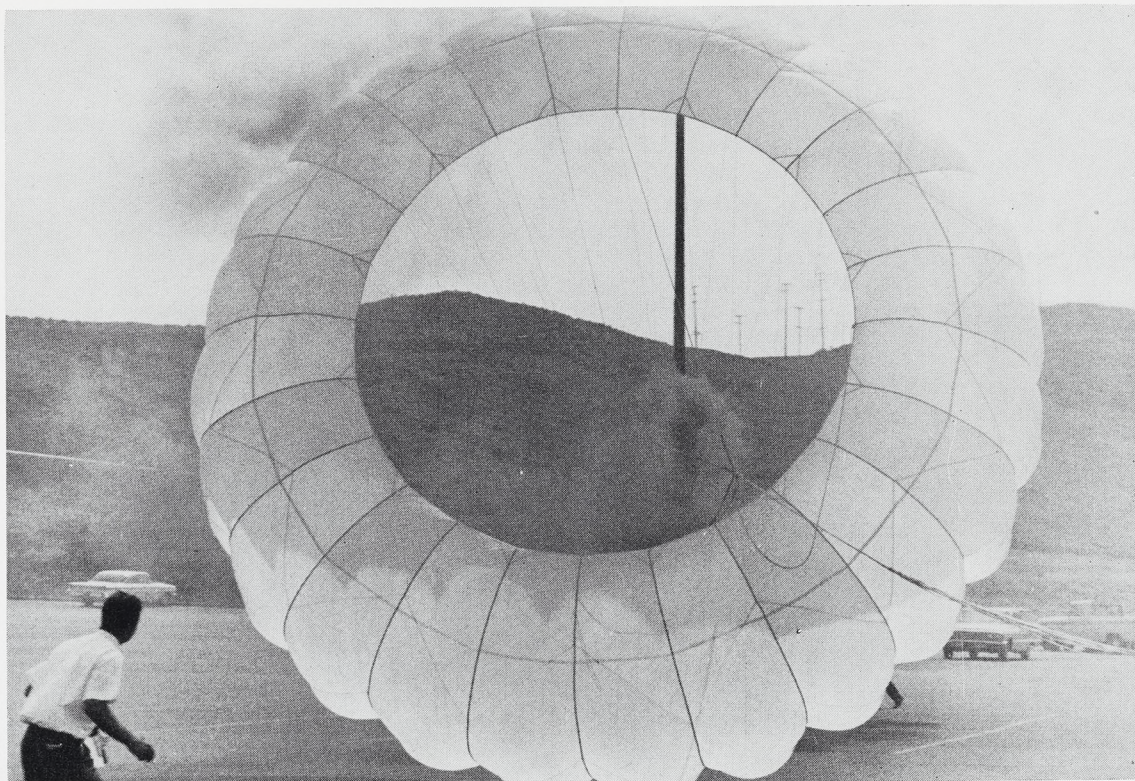
Northrop Corporation is considering acquiring The Hallicrafters Co., of Chicago, it has been announced by Thomas V. Jones, president and chairman of Northrop, and Robert F. Halligan, president of Hallicrafters.

Preliminary discussions between the managements of the two companies have centered around the possibility of Northrop's purchasing all of the Hallicrafters assets and assuming liabilities with payment to be made in cash or Northrop convertible debentures to be issued for the purpose, according to Mr. Jones.

While the terms of the transaction are still to be negotiated, Mr. Jones indicated that the total price would probably be somewhere in the neighborhood of \$20,000,000. He said discussions so far have been along the line of public holders of Hallicrafters stock receiving approximately \$8.00 a share in cash or in Northrop convertible debentures at par, with members of the Halligan family receiving somewhat less than this for their stock.

Hallicrafters currently has about 2,550,000 shares of common stock outstanding, of which slightly more than 50% are owned or controlled by members of the Halligan family. Northrop has approximately 4,168,000 shares of common stock outstanding.

"Our interest in acquiring Hallicrafters is based principally on our belief that Northrop can bring added opportunities for growth of such major Hallicrafters product lines as aerospace electronic counter-measures, shortwave FM radio communication systems, and its 'village' radio, a reliable low-cost modern communications system for new and developing communities around the world," Mr. Jones said.



Sometimes known as the "donut" parachute, this annular concept has proven that a hole in the canopy isn't always disastrous. In fact, it works more effectively in reducing drag. Northrop Ventura's Carey Buhler is inventor of the

concept, as well as designer of the granddaddy of modern personal parachute harnesses. See page 2 for the report on another "Pioneer in Paradynamics."

TOP MANAGEMENT PANEL TO DISCUSS PRESENT, FUTURE

Division management representatives will discuss current activities and the future outlook of Northrop Ventura during a Management Club meeting next Wednesday evening at Woodland Hills Country Club.

The panel will conduct the discussion based on questions submitted in advance by club members.

A social hour is scheduled for 5:30 p.m. at the country club, 21150 Dumetz Road, Woodland Hills, with dinner to be served at 6:30 p.m.

According to Club President Bill Young, scheduled panelists are George Douglas, Corporate vice president and Division general manager, W. E. Sternadel, Division treasurer, and Division vice presidents H. E. Riggins, M. A. Maurer and George Grogan. Ed Illes, Marketing director at Aero Instruments, will serve as

(See PANEL, page 6)

Vietnam Mailbag Brings Thanks for Gift Packages

Vernon Turner, a process operator in the Northrop Ventura Paint shop, had to wait in line to read a recent letter from his son, a Marine communications specialist stationed in Vietnam.

Likewise, Lillian Reilly, a utility assembler in the Electrical branch of Production Operations section, queued up to read a note from her nephew, another combat Marine.

The letters were posted on the bulletin boards at Northrop Ventura and were addressed to all Division employees. They were part of the response to 10 boxes of foodstuff which employees chipped in and purchased for servicemen in Southeast Asia.

Susan Callison, a utility assembler in Electrical branch, came up with the idea just before Christmas. She brought the subject up to Mrs. Reilly, whose nephew Jim is in Vietnam.

The idea quickly spread

through the Manufacturing building, and it was decided the boxes would be sent to relatives or close friends of employees.

John Dittman, son of Florence Green of T-38 Subassembly section, was another recipient, as well as Jim Decker, a close friend of two other Electrical Fabrication employees, Patricia Douglas and Alta Hageman.

The packages were shared by the young men with other members of their outfits, and some of the letters bore numerous signatures.

From Jim Decker, assigned to a Navy construction unit, came these words:

"At first all we heard about were the Vietnicks that were demonstrating against us being over here. Now by the number of packages, cards and good wishes that we got from all of you good people we will push harder to get the fighting over..."

Corporal Byron Turner wrote: "On behalf of my buddies and myself, I wish to thank you for the two boxes of goods you sent to us. We are very grateful and appreciate your thoughtfulness."

"It is not often that we receive gifts from unknown friends, and it does our hearts and morale a great deal of good to know that we have people like you behind us back home."

Coordination of the project, which involved nearly 200 contributors, was handled by Mary Ann Cox, secretary to Mike Antenucci, foreman of the Electrical branch.

The Northrop Ventura Recreation Club donated \$30 to the project, and the Organization of Northrop Employees donated \$25.

The Shipping department took over the careful packaging to assure delivery of the foodstuffs and the Mailroom provided the last Newbury Park step in delivering packages to the post office.

Apollo Abort Test Series Concluded

A vital test phase in the Apollo program to place Americans on the moon was completed January 20 as a flight model spacecraft—with three 83.5-foot Ringsail parachutes—settled to the desert floor near White Sands, New Mexico.

It was the sixth and final test of the spacecraft's launch escape system. It also was the sixth time that the Earth Landing System, developed by Northrop Ventura, has functioned successfully in the White Sands series of tests.

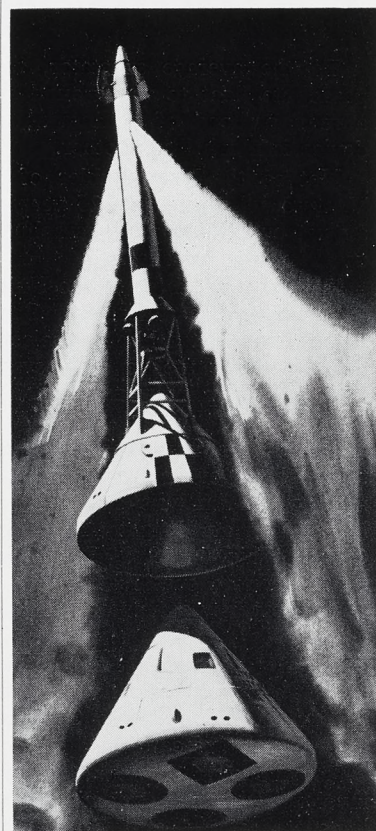
Following the test, NASA and North American Aviation officials declared the launch escape system operational. North American's Space Division of Downey is prime contractor for the Apollo vehicle under contract to NASA's Manned Spacecraft Center, Houston.

The launch escape system is a pencil-shaped fast getaway rocket which sits atop the spacecraft. It is designed to rocket lunar astronauts to safety in event of an emergency.

The most recent test simulated the severest abort condition—in the "power on tumbling" region. This condition occurs when the launch escape motor pulls the command module from the booster during a pitchup of the launch vehicle, causing the spacecraft to tumble while in flight.

A Little Joe II booster, built by General Dynamics, played the role of a Saturn rocket in trouble. Saturn is scheduled to be the launch vehicle for the first manned moon flight.

In addition to the White Sands (See APOLLO, page 6)



Its work done, Apollo spacecraft 002's boost protective cover is pulled free in this North American Space Division drawing of mid-flight phase of abort test. This step is reached after launch escape rocket "rescues" command module from a staged malfunction aboard a Little Joe II booster playing role of a Saturn in trouble.

NINTH TO JOIN NORTHROP

Aircraft Lured Phil Chase From Medicine

A funny thing happened to Phil Chase on the way to enroll at UCLA Medical School back in 1929. He



Mr. Chase

stopped to see a relative who was working for an aircraft company and became infatuated with the then absurd idea of wide-spread commercial air travel and military air power.

His grandfather wanted him to be a doctor and had set up a trust fund to make it possible, but Phil was an adventurer in an era of romance and discovery.

He went to work as a stock clerk in an aircraft factory.

"Everyone left his personal stamp on aircraft in those days," he recalled, "even the janitor. When the carpenters finished shaping a piece of fuselage or wing, the foreman would blow a whistle, and we'd all run up, grab a hammer and pound in the brass brads before the glue dried."

But as everyone knows, the business climate at that time was far from ideal, and that company went bankrupt, recalls Mr. Chase, who is now director of Facilities and Maintenance at Northrop Ventura.

Phil Chase, the adventurer, loaded up a mule and a pack-horse and tackled some of the toughest territory in the west. He followed the John Muir Trail through the High Sierras from beginning to end. It took him

four weeks to traverse the 120 miles.

Phil came back to Los Angeles and, with one eye still on the aircraft industry, went to work on a part-time basis for Republic studios as a stunt man in the Buck Jones series and other westerns.

"My specialty was falling off horses," he says, "but occasionally I got to fall off stage-coaches."

Whether or not the fact that Phil knew enough about horses to stay on one was a motivational factor or not, we don't know, but he turned to the rodeo circuit about the same time. Between falling off horses and being thrown off horses, he picked up a few blue ribbons and made a

(See PIONEER, page 6)

FRINGE BENEFITS

'20-30-40 Plan': New Approach To Life Insurance Program



By WILLIAM LARRABEE
Vice President—Industrial Relations

As you know, your company has people working throughout the year on a continuous study of our fringe benefits. Their aim is to keep us comparable with our industry. Fortunately, "comparable" does not mean that we are carbon copies of what other people do. Our people are instructed to be imaginative and to think out in front of others as to the real needs of the men and women of Northrop.

As a result, every once in awhile we have what has come to be known as a "Northrop First." This may be something brand new or it may be a different slant on something which exists elsewhere but which serves Northrop people better.

One subject kept coming up again and again during recent brainstorming sessions. Almost all large companies have group life insurance programs where a beneficiary named in the group policy gets a sum of money if the employee dies. Not too many people seem to have given real thought, however, to the family which suddenly loses the wage earner. Nothing is more important to this family than some money coming in regularly for awhile until it gets readjusted, particularly where there are children who must stay in school to get the education they need so badly these days.

In line with this thinking, our people sat down with our insurance advisors to work out something, with two objectives. First, this new plan must provide a monthly amount which would be payable to a surviving husband or wife of a Northrop employee, or if there be none, to the dependent minor children. Second, the amount to be paid must be absolutely plain in order that the survivor or the children would know exactly how much they could count on and for how long.

A program was developed which we might call the "20-30-40 Plan." This program is in addition to the insurance we already have. A general description of how it works was included in the recent announcement of fringe benefit changes which was made on the 19th

of January. As you read there, a policy will go into effect for the individual employee after 90 days of continuous service which will pay his surviving spouse or youngsters \$100 a month for one year.

After the employee completes 10 years of continuous service, the payments mount up and this is where the "20-30-40" begins to take effect. The policy then goes on a schedule which appeared in the announcement and the 10-year person has the protection set out in the schedule for 20 months. The 15-year person has the same protection for 30 months, and the 20-year person has the same protection for 40 months.

There is no problem at all for a family to know exactly what this coverage is. If a 10-year man makes \$100 a week as his base rate, the schedule shows that his eligible family will get \$100 a month for 20 months. If his base rate is \$200 a week the payments will be \$200 a month for 20 months. If the man has 15 years' service, such payments will be made for 30 months. If he has 20 years' service, such payments will be made for 40 months.

This program accomplishes the objective which we started out to achieve. The widow or widower or the youngsters can tell immediately how much they can count on for how long, and they will know that the payments will be made up to the time limit as long as there are eligible people to receive them. We again have a "Northrop First," not that life insurance is new, but we have worked out something clearly adapted to a real need of Northrop families. All of this is done, of course, at company expense.

It will take a little while to get the plan printed up and distributed in its full details, but something will be out in this connection as soon as the insurance company can get it to us.

Hal Janssen of Nortronics is the chairman of our Northrop Industrial Relations subcommittee which does much of the thinking on our fringe benefit programs. He was responsible in large part for working out the new "20-30-40 Plan."



Mr. Janssen

T-38 Flight Hour Record Claimed By Webb ATC Unit

Webb Air Force Base, Texas, recently claimed a new record for the largest number of flight hours logged by a supersonic T-38 Talon trainer—over 2000.

Shortly before the end of last year T-38 61-0807 touched down at the Texas base with 2000.25 hours on its flight records. Captain Walter L. Kowalik, Flight Test pilot, was at the controls with Colonel Chester J. Butcher, Webb's wing commander, occupying the second seat.

According to Webb sources, "807" was the first Air Training Command "bird" of its type to reach this milestone. Thus the record, subject to confirmation, would be a new one for the T-38s within all United States Air Force inventories.

Major Garland J. McClure, Webb's Quality Control Section head, indicated at the time no other T-38 was within 50 hours of this total, but added T-38 61-0809 ranked as the closest competitor. The latter "bird" is also assigned to the Texas base.

Webb Air Force Base was the first Air Training Command installation to receive the Northrop-built T-38 for supersonic student pilot training and has posted other outstanding marks in hours logged.

Frank Ross a Winner In Slogan Contest

Frank D. Ross, a Northrop Norair design engineer, was one of more than 30 prize winners in the 1965 United Crusade Slogan Contest.

Mr. Ross's entry earned him a case of tuna, donated by Star-Kist Foods, which he said "will come in handy with five kids around the house."



TV Appearance Set For Joanie Cahn

Joanie Cahn, pianist and nine-year-old daughter of Mr. and Mrs. Mickey Cahn, will be featured Sunday on Ted Mack's Amateur Hour on CBS Television, Channel 2.

The program was taped earlier this month in Los Angeles, according to Mr. Cahn, who is an engineer at Northrop Norair.

A fourth grader at Edison Elementary School in Torrance, Joanie won first place at the 1965 Southwest Youth Music Festival.

Janet Carroll Wins Junior Miss Title

Laurence B. Carroll jr. is prouder than ever of his 17-year-old daughter Janet, if that's possible.

Janet has won the title of 1966 Ventura County Junior Miss in competition with 12 other high-caliber county-wide finalists from six high schools.

Northrop Ventura's director of Production and Production Engineering approves wholeheartedly of the Junior Miss Pageant, particularly since competition is based on all-around capabilities, not just beauty.

For example, in the four-phase contest, Janet was honored as tops in scholastic capability.

She also captured the hearts of fellow contestants, who voted her Miss Congeniality.

PIONEERS IN PARADYNAMICS: PART 4

A Chute With a Hole in It and a Harness for Astronauts

To the average spectator, watching a parachute float to the ground supporting a man or load of equipment, one such device is much like another.

Not so to Carey Buhler of Northrop Ventura, who for some 25 years has done almost everything with parachutes except use them for bedsheets.

For example, three of the United States space programs, Mercury, Gemini and Apollo, have listed him as project engineer on the parachute landing systems, the first two with primary responsibility in that area.

Mr. Buhler, now Apollo parachute system project engineer for Systems Engineering and Analysis, started his engineering career at Wright Air Development Center, Ohio, in 1940. For a year and a half he wrote specifications on aeronautical emergency equipment, including parachutes.

Paradynamics was the most interesting subject of the specifications he wrote, Mr. Buhler felt, so that was the direction he took next in his career.

For another 6½ years at Wright he was involved with paradynamics, often utilizing specifications he himself had developed in his previous work.

It was during this period, in 1947, that Mr. Buhler filed his patent on an annular parachute, which, surprising to some people, produces more drag because of a large central opening.

This same chute is the predecessor of

one now being investigated by Ed Ewing at Northrop Ventura for aerial pickup of satellites.

Mr. Ewing, another pioneer paradynamist at Ventura, has combined Mr. Buhler's patented large annular opening with alternating rings of nylon fabric and open slots in a canopy type currently being evaluated.

"These 'airfoil chutes,'" Mr. Buhler indicated, "are much more stable than other designs at altitudes of 35,000 or 40,000

feet and higher, the region where parachutes must be inflated for satellite pickup.

"The over-all canopy diameter for the same amount of drag as produced by other designs is larger, but the area of actual material is less, reducing weight and bulk."

While serving as technical director of the Naval Parachute Facility, El Centro, Mr. Buhler directed development of a parachute system for escape from vehicles at supersonic speeds, and a system for VTOL aircraft that would protect pilots

even during takeoff and landing.

At El Centro, he worked on the granddaddy of the personal harness now used by the astronauts.

"Until 1954," Mr. Buhler said, "anyone putting on a parachute harness could expect to be gouged in half a dozen places. There were buckles you sat on and leaned against, and it was hard to be comfortable during a flight of any duration.

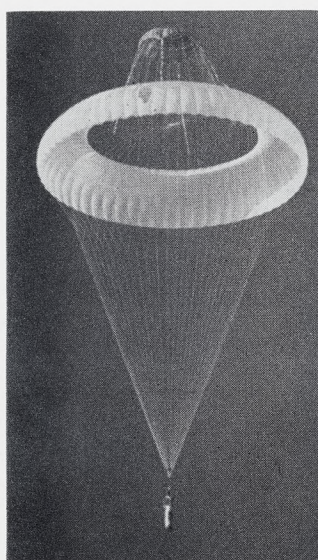
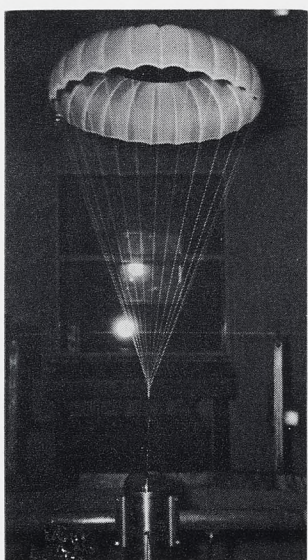
"The harness we developed at El Centro had only one adjuster, on the chest of the wearer. Today's integrated suit harness, used in exposure suits, full pressure suits, or G suits, is a direct descendant of that one."

For a man connected with paradynamics, Mr. Buhler hasn't jumped very often, just twice. Both times he ended up in the water. The first jump was at Indian Lake, Ohio, and the second a free fall jump near El Centro, into the Salton Sea.

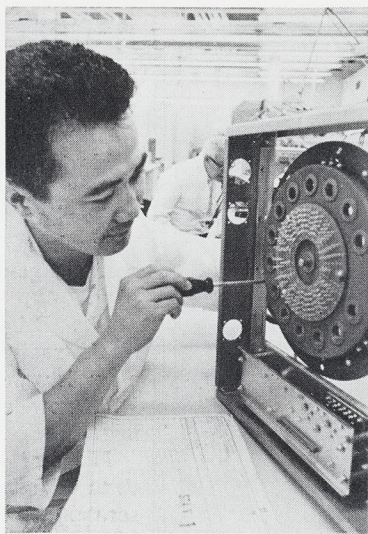
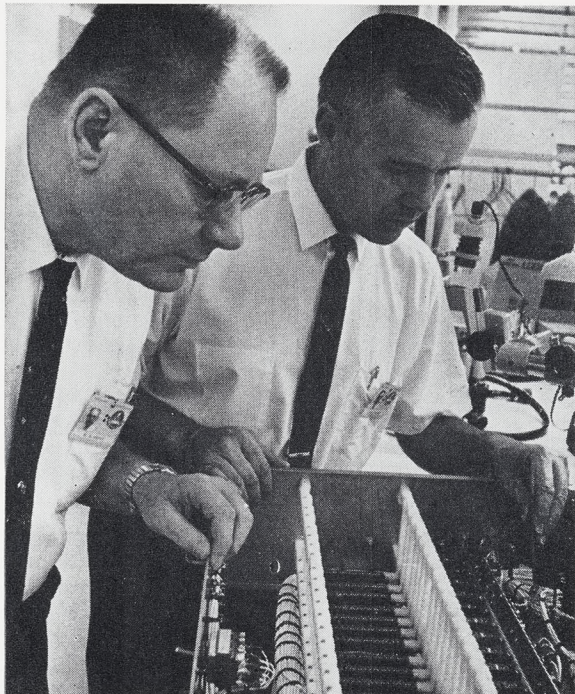
"I didn't get enough of a thrill out of it," he said, "to take it up as a regular thing. But I am glad to have experienced it those two times."

Mr. Buhler's first responsibility at Northrop Ventura, in 1956, was a recovery system for an air-to-ground missile, the Green Quail GAM-72.

He was project engineer during the entire Mercury recovery system effort from 1959 to 1962 and on Gemini from the program's inception through the first year and a half.

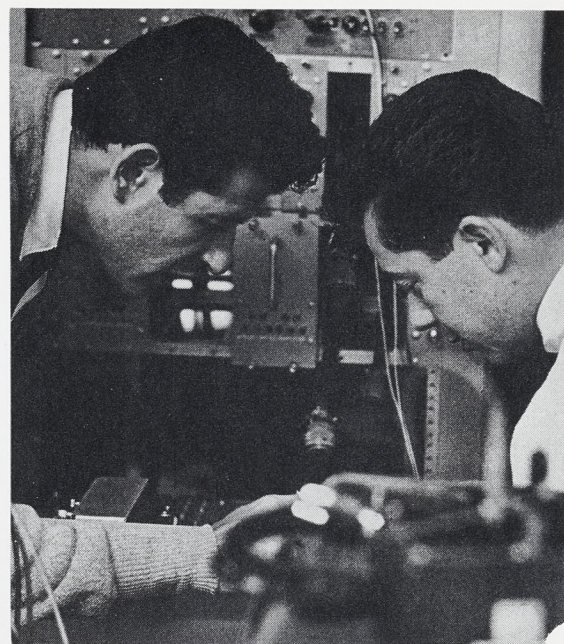


Carey Buhler (left) holds patent on annular parachute (center) shown here in 1947 test at Wright Air Development Center. Ed Ewing of Northrop Ventura has combined annular chute with innovations of his own to produce "airfoil" concept (right).

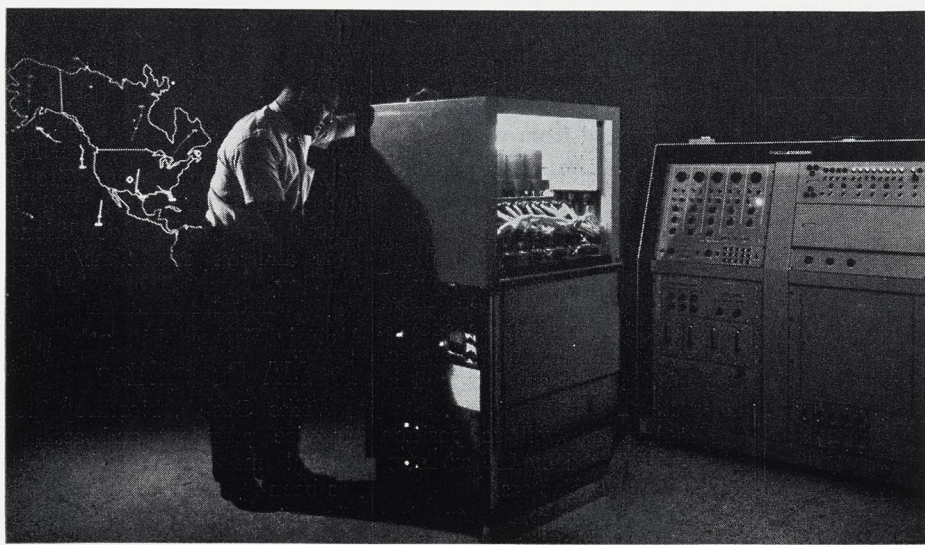


Norm Singer (left), AUTEC system project engineer, and Vince Gesualdi hold engineering consultation.

Symbol drum wiring is assembly task for Mrs. Jean Pierce (photo below) while H. M. Tokashiki works on symbol generator assembly (at left). In photo at right, W. R. Duffy and A. R. Carter carry out inspection on symbol select matrix. Fabrication of Vigicon units is centered in Engineering Development Support group at Palos Verdes.



Complete Vigicon display system (at left) receives attention of Chuck Blaney, applications engineer at Research Park, Palos Verdes. This system is used in demonstrations for potential users. M. H. Holton (at right) runs test on slide changer.



Vigicon Delivers the Big Picture—in Real Time

Little more than three years ago Vigicon was no more than a name and a concept in what is now the Information Displays group at Nortronics, Palos Verdes.

Today, Nortronics' Vigicon display systems are protecting lives and supporting multimillion dollar programs by providing complex systems of real-time information.

Such information includes observed objects in their real-time positions, vector or continuous line imagery showing paths of these observed objects, and background maps or diagrams.

Since Gemini 4, Vigicon has played its data presentation role during manned space shots, including the recent Gemini 6 and 7 rendezvous mission. With Apollo, the work will continue.

The Navy's Anti-Submarine Warfare training program uses six display systems at Norfolk, Virginia, and San Diego, California.

Navy helicopter crew instructors keep track of the aircraft and their targets in simulated flight with trailerized Vigicons at four locations in this country and Japan.

A dramatic new application for Vigicon is at the Navy's first underwater test range (Atlantic Underwater Test Evaluation Center), Andros Island, Bahamas. There the system provides real-time display of vehicles in the air, on the sea, and underwater during missile and weapon testing.

At Mare Island Naval Station, California, a Vigicon performs as a conning tower simulator in submarine training work. Three systems utilized by the Atlantic

Fleet Weapons Range at Roosevelt Roads, Puerto Rico, evaluate the tactical deployment of weapons systems, recording and displaying ship positions, aircraft movements, weapon firings, troop landings and other activities.

The United States space program utilizes four Vigicon display systems in all.

One is at Cape Kennedy for the Air Force Eastern Test Range where missile, satellite and space vehicle trajectories and orbits are traced in the range control center.

An additional Vigicon installed for Apollo and Gemini mission analysis is located at NASA's Goddard Space Flight Center in Maryland.

At the Manned Space Flight Center in Houston, Texas, a Vigicon analyses, selects and displays

optimum recovery systems for spacecraft during terminal landing operations.

X-15 flights from the NASA Flight Research Center at Edwards Air Force Base, California, are monitored by Vigicon.

What exactly is Vigicon?

The Greek syllables that give the display system its name mean alert image. The system can utilize inputs from a multitude of sources to project real-time information onto a screen ranging from 15 inches to 20 feet square.

Typical inputs include telemetry signals, communications transmissions, photographic material and computerized inputs. Information can be generated and presented on a screen within milliseconds of acquisition without any pre-processing procedure.

Final inputs to the presentation equipment must be in the form of dc analog voltages, so, in digital input applications data buffers or converters are used.

Each Vigicon system is customer designed from off-the-shelf hardware according to the user's needs. Because Vigicon relies on modules to form the total system, a great variety of configurations may be prepared.

The backbone of the system is a series of compact projectors four inches wide, which are arranged in arrays for projection of data images. Optical accuracy is in the area of .0005 inches.

Three basic types of projectors, for reference information, spotting of moving targets, and plotting of continuous line imagery and symbology, are available.

The projectors rely on the same series of components to provide the required capabilities. They receive and simultaneously project the real-time information to be displayed.

The basic components include a light generator, slide change mechanism, an X-Y axes servomechanism, projection optics and a six-color turret.

Information may be projected in contrasting colors. Color, although not always essential in a display system, is a characteristic readily accepted by man for purposes of target classification.

The light source is an incandescent lamp in an air-cooled housing with a heat glass for protection of slides.

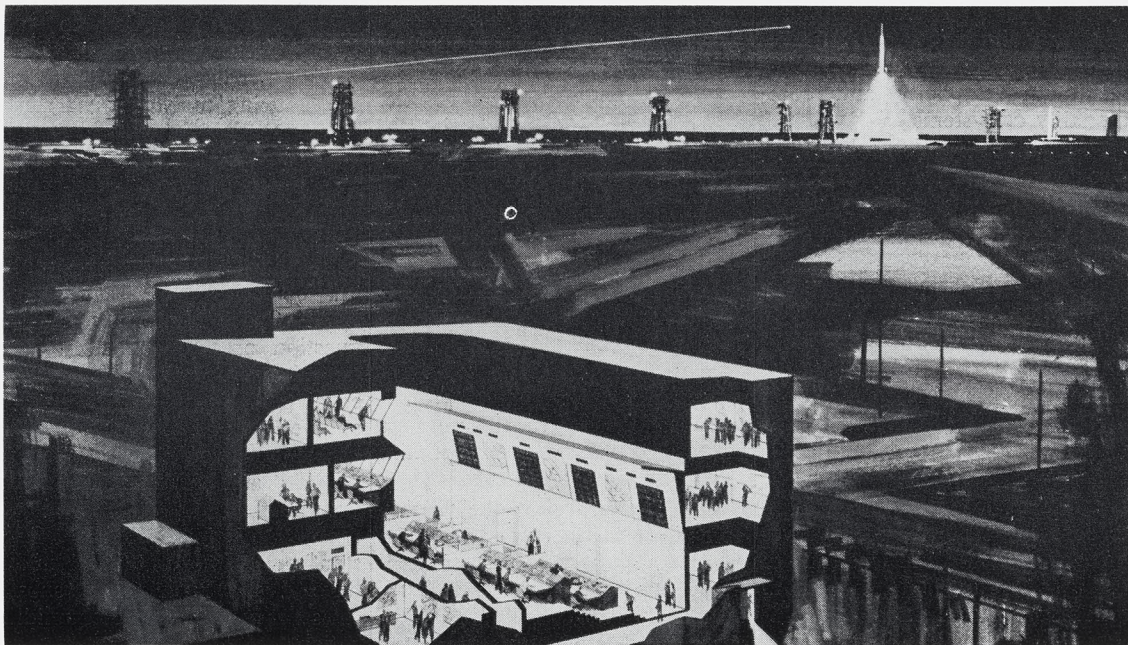
Redundancy is provided by dual lamps. When one burns out, the lamp carrier automatically rotates for continuous service. The burned-out bulb may be changed while the projector remains in operation.

The plotting projector includes the light generator, slide change mechanism, X-Y axes servomechanism, projection lens, and optionally, the color control.

Forty slides are retained in each magazine. In the plotting projector configuration the slides are blank and opaque. A stylus mounted on a plate is automatically placed in contact with the slide in use to scribe the necessary vector lines or symbols through the opaque coating. Slides may be changed automatically by the system or manually by the operator.

The spotting projector contains a metal plate or slide controlled by the X-Y servomechanism and bearing any desired symbol —

(See VIGICON, page 4)



Artist's concept shows control center at Air Force Eastern Test Range, where one Vigicon system is already installed.

Black areas between screens are electronic status boards. Control room is at Kennedy Space Center in Florida.

Government Agencies Taking Close Look At 'Highly Imaginative' HL-10 Project

The impact of Northrop's "highly imaginative and economical approach" to the development and construction of the M-2 and HL-10 lifting body research vehicles may have a significant effect on the management of such projects and the way of doing business with the government, according to Paul F. Bikle, director of NASA's Flight Research Center.

"Northrop Norair has used a highly imaginative and economical approach to the construction of the M-2 and HL-10. They have selected a small group of extremely well qualified hand-picked engineers and technicians to perform the work.

"They have taken readily available components — items that have already proven themselves in actual flight — and used them whenever possible in the lifting body.

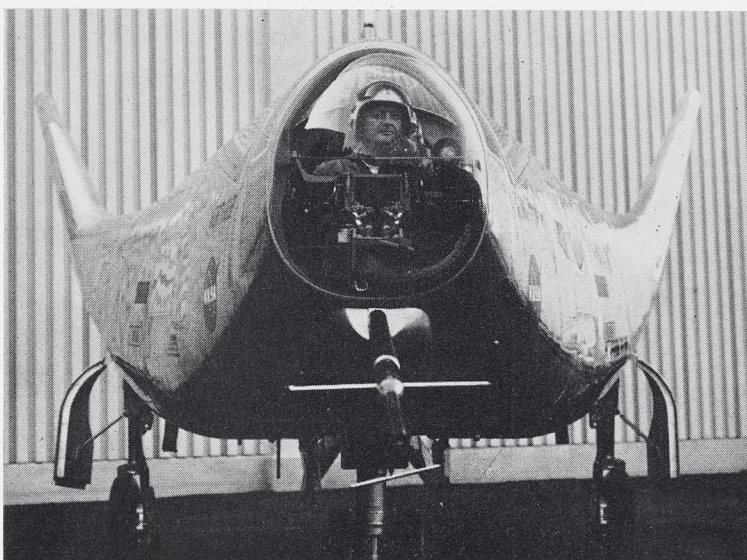
"Decisions for modifications and changes, that normally require reams of paperwork, were discussed through almost daily meetings of the principals responsible.

"All of the personnel involved enjoyed an extremely close working relationship."

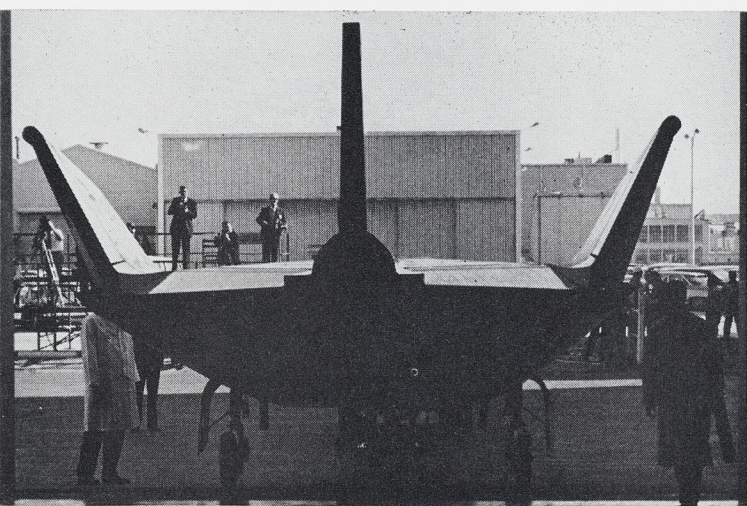
Mr. Bikle, who was NASA representative at HL-10 delivery ceremonies January 18, said the noteworthy approach has not gone unnoticed, "either by NASA or other people for that matter."

"These other interested parties have shown both formal and informal interest and all have been most impressed and full of praise."

The transformation from wind tunnel and theoretical design to actual flight vehicle is more than just building and construction



SHAPE OF THE FUTURE?—Contrasting views of front, above, and rear of Northrop's HL-10 lifting body research vehicle are captured in these pictures. Milton Thompson, chief test pilot for NASA lifting body program, sits in cockpit where he has wide angle view for landing. Tri-fins of HL-10 are highlighted below during rollout ceremonies in photo by Dave Saldana.



work, Mr. Bikle pointed out.

"Norair has often been required to solve more basic design problems. They have added greatly to the advancement of lifting

body technology."

Addressing members of the program staff, government representatives and Northrop management, Mr. Bikle continued:

"Under the terms of an intentionally loosely-written contract, where it would have been possible for you to use shorter and cheaper methods, your engineers and technicians have steadily refused to sacrifice quality. It is easy to see that there was a great deal of pride in the workmanship that went into the construction of the HL-10.

"Even the most casual observer must recognize that both the M-2 and HL-10 are highly unusual flying machines. Norair deserves the greatest credit for the manner in which they have overcome the problems in building these unconventional aircraft.

"In the long run . . . the really significant contribution of this effort may well prove to be the impact it may have on the management of projects of this nature, and the way of doing business with the government."

Mr. Bikle accepted the vehicle, on behalf of NASA, from Northrop President and Chairman Thomas V. Jones.

Also on the program at Hawthorne was Brigadier General B. G. Holzman (ret.), who read the prepared remarks of Dr. Alfred J. Eggers, jr., NASA's deputy associate administrator for Advanced Research and Technology. Dr. Eggers was the scheduled principal speaker, but pressing business matters in Washington kept him from attending.

Dr. Eggers praised the "highly competent manner" in which the M-2 and HL-10 were constructed. As did Mr. Bikle, Dr. Eggers lauded the efforts of the Langley Research Center which designed the HL-10 and the Ames Research Center which designed the M-2.

PERFECT GAME NETS BONANZA FOR BOWLER

Nortronics Hawthorne's Robert E. Briggs really reaped a bowling bonanza late last year when he rolled his second perfect game in sanctioned play.

Mr. Briggs won \$300, a clock trophy, a diamond ring, a wristwatch, new bowling ball, new shoes and a new bag.

His feat came in the Gardena Valley Classic (925 scratch) and ended what had been a "rough" night for him (he had rolled 189 and 171 games with a 198 average).

Ten years ago Mr. Briggs rolled his first perfect game, ending the night with an impressive 808 scratch series. His other games were 256 and 252.

VIGICON

(Continued from page 3)

cross hairs, aircraft, missile or other target.

The image of this symbol is projected on the screen in position according to information provided Vigicon. When more than one target must be shown, at any one time additional projectors of this type are included in the system.

Headings as well as position can be indicated by use of rotating spotting projectors.

The reference projector does not include a plotting mechanism. Its magazine stores up to 40 prepared slides with reference material such as maps, profiles, compass roses or diagrams.

All information is shown on a single screen unless multiple screens are required by the user.

'AIR CONDITIONED' SPACE SUITS POSSIBLE WITH NSL CONCEPT

Keeping cool during hot summer weather on earth is relatively simple during these days of air conditioning, but keeping space-going astronauts comfortable in their insulated space suits is something else again.

Northrop Space Laboratories has come up with some ideas in space suit cooling and dehumidification in zero or lunar gravity that could eventually produce less complex, less expensive and more dependable suits.

The first astronauts relied on blasts of air throughout their suits to keep them cool and remove moisture. Since then, liquid circulated through tubes in the suits has been added to cool them. The airflow remained but could be reduced since it was only removing moisture, not sensible heat.

NSL was one of the pioneer investigators of the liquid-cooled suit concept. Although not currently in use for Gemini, the concept will be applied on Apollo missions.

At Space Laboratories, the question arose: Why not eliminate the complexity of a circulated air loop completely by finding another way of dehumidifying? A gas system would be retained to provide suit pressurization and breathing.

For some time, Bill Woo, Constantino Cafaro and Bill Bentilla have been investigating substitutes for the air loop dehumidification.

Working in the Thermodynamics group under the direction of

Page Wins Contract in Australia

The Overseas Telecommunications Commission of Australia has awarded Page Communications Engineers a contract to install a satellite communications earth station at Carnarvon, Australia.

The western Australian station, scheduled to be completed and operational by October 1966, will be used initially as part of a worldwide communications system to provide tracking and data acquisition for the NASA Apollo Manned Lunar Landing program. Further utilization is planned in the development of commercial satellite communications to provide relief for Pacific and Southeast Asia coaxial cable systems soon to be working at full capacity.

Principal features of the Page-designed earth station are the 42-foot Casshorn antenna, the very low noise receiver, and the high precision control system. Ground mounted equipment will be housed in two air conditioned vans and an operations/control building.

Norair Exec Named To AIA Committee

Welko Gasich, Northrop Norair vice president and assistant general manager-Technical, has been named vice chairman of Aircraft Industries Association's Vertical Lift Aircraft Council.

The Council includes representatives from 15 member companies. It coordinates and presents vertical lift industry's views on common problems and acts to advance and promote the worldwide utilization of VTOL.

LIFTING BODY SUCCESS CREDITED TO 'JOINT ACTION MANAGEMENT'

The production of M-2 and HL-10 lifting body vehicles "at a fraction of the cost and in a fraction of the time regarded as acceptable for comparable projects" was credited by Northrop President and Chairman Thomas V. Jones to a Joint Action Management Plan initiated by Northrop and NASA for the development program.

Speaking at rollout ceremonies of the HL-10 last month at Norair, Mr. Jones outlined the 10 principles used in establishment and operation of the management plan:

1. The vehicle was designed and constructed for operation in a specific environment and to meet only those specifications that are necessary for operation in that environment.

2. Proven off-the-shelf hardware and existing know-how were used thus avoiding reliance on technological breakthroughs.

3. An autonomous project area was established and key people were given full authority and power to make on-the-spot decisions, thus shortening the chain of approval required to take action.

4. The project was staffed with an elite team of specialists with maturity and experience the most important qualifications. Average experience of design and shop specialists on the HL-10 project was 20 years.

5. Each member of the team was fully indoctrinated in the goals of the program. Each individual was given personal responsibility for his portion of the end product, with decisions made by responsible individuals, not committees.

6. Paperwork was kept to a

minimum. In the small, self-contained unit, communications for these purposes were direct and personal.

7. The project was located in an integrated area where engineering, tooling, manufacturing, planning, material coordination, and assembly were in the same room or in an immediately adjacent area.

8. Basic design approach was based upon: (1) realistic appraisal of the requirements; (2) conservative structural design; and (3) maximum simplicity and commonality of systems.

9. Detailed parts fabrication was accomplished in the advanced production shop where equipment and personnel are adaptable to one-of-a-kind fabrication.

10. The entire vehicle was assembled on a tooling dock.

"None of these principles could have been applied without the fullest cooperation by NASA," Mr. Jones said. "In fact, this may well be the most important single element in the plan.

"NASA's people were willing to forego all of the prerogatives of government and instead to place their confidence in the autonomous management of this project, to look at it not as a Northrop-managed project but as a jointly managed project."

Classified

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads. Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

For Sale

Carpentering, 73 yds., all wool, deep pile, gold broadloom, 5 months since new, orig. cost \$1095, now \$365. L.A., 472-2571. A

Volkswagen Camper, 1961, radio, 5 new Premium tires & tubes, ext. awning & side enclosures, built-in ice box & fresh water supply, \$1175. Torrance, 371-5229. A

Baby Crib, \$25. Torrance, 325-244. A

Lot in Calif. City, near new school, \$3500. Gardena, 327-2666. A

Eico, 723, 60 watt, 80-10 meter, transmitter w/relays & crystals, \$30. San Pedro, TE 3-9596. A

House Trailer, 1956, Kenskill, 23½', equipped for on the road living, gas refrig. & gas lights, 12 V. to 110 V. inverter, dble. bed, stall shower, \$1695. P. V., 377-1075. A

Studebaker Lark, 1961, 4-dr. sedan, 43,000 mi., \$680. Hermosa Beach, FR 9-7342. A

Austin Healey Sprite, 1959, \$550. Torrance, 328-0605. A

Ford, 1947, 4-dr., \$375. Playa del Rey, 391-8072. A

Rambler Station Wagon, 1961, automatic, \$375. Lawndale, 679-8426. A

AM-FM Tuner, multiplexer, 30-watt stereo amplifier & 2 12" coaxial speakers, \$70. Torrance, FR 8-1350. A

Bicycle, convt. boy or girl model, 20", \$15. Costa Mesa, 714-546-5341. A

Tennis Raquet, ladies' & frame, \$5. Hawthorne, 676-3575. A

Organ, Baldwin Model 40 Orga-Sonic w/percussion, Philippine mahogany, matching bench, 2 keyboards, 1 octave of bass pedals, \$675. Redondo Beach, FR 5-3914. A

Outboard, Century plus, 5 HP, used about 3 hours, \$185. Marina del Rey, 392-3173. A

Rifle, .22 Marlin, lever action, \$50. Redondo Beach, 370-7213. A

TV, 24" RCA, contemporary birch console, new picture tube, compl. set of spare tubes, \$75. Lomita, DA 6-6214. A

Washer, RCA Whirlpool, auto. w/matching gas dryer, pink, \$100. Redondo Beach, 375-3266. A

Lot, single, Inglewood Park Cemetery, Parkview, \$550. Torrance, TE 5-2128. A

Ski Boat, Corsair SK-15, 15', 90 HP Evinrude, tach., speedometer, many extras, \$1600. Simi, 805-526-1677. A

Corvette, 1962, h/top, new Goodyear tires, 300 HP, 4-spd., \$2350. Compton, NE 2-7635. A

Cadillac, 1962, 2-dr., low mileage, \$2250. El Segundo, EA 2-0677. A

Range, elec., Westinghouse, coppertone, 4-burner, auto. oven & timer, \$175. Gardena, 324-0274. A

Ford, 1953, rebuilt engine, \$250. Hawthorne, 676-6787. A

Rifle, .308 caliber, bolt action, w/sling & recoil pad, \$50. Hawthorne, OS 6-4915. A

Cruiser, 1962 Chris-Craft, 32', sleeps 7, twin Chrysler marine engs., full canvas covered, new C/G approved life jackets, new paint, many extras, \$6500. Gardena, 323-5951. A

Condominium Studio Home, 3 bdrms., 2½-bath, all elec., built-ins, fireplace, closed gar. & carport, pool, putting green & clubhouse, 10 min. from Northrop, \$31,000. Torrance, DA 7-2831. A

Topsoil, 2 yards, lge. dump truck load, you pick up, \$15. L.A., 645-8373. A

Mercury Park Lane sta. wagon, 1960, p/b, p/s, p/w & p/seats, air conditioning, new brakes & new tires, \$800. Hawthorne, 644-3162. A

Stenotype, \$25. Redondo Bch., FR 2-1402. A

Sloop, 24' Herrshoff, 1961, rugged ocean cruiser/racer, fully founded, top craftsman-ship, \$5500. Gardena, 324-8664. A

Bicycle, Campi, 10-spd., \$80. L.A., 476-1649. A

Chevrolet Station Wagon, 1957, 4-dr., new paint, r/h, good tires, Powerglide, rebuilt motor, new shocks, \$450. Torrance, 324-5698. A

Freezer, Sears, 14 cu. ft., chest-type, \$20. Harbor City, 326-1409. A

Television, 17" Packard Bell, antenna & spare tubes, \$50. Torrance, DA 3-8797. A

Table Saw, 10", ½ HP motor, 2 exts., bench, dado & mortising set, \$95. Gardena, DA 3-3202. A

Luggage Carrier for station wagon, extra long, zipper encl., 6' x 4' x 1', rainproof canvas, \$25. Lawndale, OS 9-0876. A

Honda, 50 cc, 1965, w/elec. starter, windshield & mirrors, only 50 miles, \$225. Inglewood, 754-3946. A

Truck, 1965 Ford Ranchero, r/h, 6-cyl. stick shift, new car guarantee, \$200 & take over \$59.89 mo. pymnts., \$1650. Newbury Pk., 805-889-0588. A

Bicycle, girl's, 24", J. C. Higgins, \$15. Hawthorne, OS 5-2882. A

T-Bird, 1956, h/top, recent o/haul, paint & tires, auto., orig. owner, \$1275. Pacific Palisades, 454-2057. A

For Sale

Folding Bed, ¾ size w/innerspring mattress, \$25. Torrance, DA 5-5245. A

Honda 90, 1965, low mileage, \$350. Ross-moor, GE 1-7765. A

Dog House, \$5. Hawthorne, 675-9389. A

Stove, O'Keefe & Merritt, full size oven & broiler, 34" wide, \$45. Gardena, 327-2279. A

Air Conditioner, Universal, for auto, used 2 times, cost \$45, \$25. L.A., 472-3374. A

Chevrolet, 1949, Carryall, 8-pass., new headliner & paint job, \$200. Hawthorne, OS 5-1354. A

Sewing Machine, Kenmore blonde console, buttonhole attachment, \$40. Torrance, 327-3344. A

Nash Ambassador sedan, 1951, good eng., \$100. Anaheim, KE 5-6296. A

House, 3-bdrm., den, 1¾ baths, built-in stove, dishwasher, lge. backyard, sprinklers, 3-yrs-old, GI loan, \$27,500. Los Alamitos, 430-7721. A

El Camino, 1959, 4 spd., 348 cu. in., Tri Power, \$750. Hawthorne, OS 9-2771. A

TV, 19" Zenith, portable, & stand, 2-yrs-old, \$100. L.A., 754-9889. A

Lock Sets, 2 Schlage doorknob, brass, keyed alike, \$10. Inglewood, OR 4-1654. A

House, 3-bdrm., 2-bath, family rm., custom kitchen w/built-ins, \$32,500. Manhattan Bch., FR 6-7681. A

Plymouth, 1958 4-dr., good mech. cond., \$400. Wilmington, DA 6-2729. A

Baby Swing, convt. seat for car use, also plastic baby carrier, \$8. Gardena, 329-9484. A

Range, elec., Kenmore, 4 burners, 2 ovens, 2 storage drws., \$75. Manhattan Bch., 372-4907. A

Washer, G.E. automatic, 12 lbs. cap. \$50. Hollydale, ME 3-2395. A

House, 4-bdrm., family room, 2½ baths, 1 acre, horses OK, near Northrop Ventura, \$35,000. Somis, 805-482-1186. A

Ford Pickup, 1965 ½-ton, custom, V-8, Cruise-O-Matic, plus many extras, air conditioning, \$2450. Gardena, 329-9249. A

Volkswagen, deluxe station wagon, 1961, new paint, eng. recently o/hailed, \$1100. Anaheim, TA 8-2440. A

Chevrolet, 1957 4-dr., auto., w/w, r/h, low mileage, \$325. Compton, 632-3623. A

Surfboard, 9' Jacob, 2 redwood stringer pigment, reinforced skag, 1-yr-old, \$70. Torrance, 370-2048. A

Ford, 1959 4-dr., r/h, auto., low mileage, \$300. Manhattan Bch., FR 2-0623. A

Baby Furnishings, youth bed & mattress, playpen, car seat, stroller, \$30. Torrance, 371-7298. A

Surfboard, 9'6", \$55. Torrance, DA 9-9670. A

Land, L.A. County, Antelope Valley Hi Vista area, 2½A, 5A, 10A, terms, \$450. Los Alamitos, 431-7056. A

Ford Roadster, 1932, \$300. Lawndale, OS 5-1219. A

T-Bird, 1955, new factory eng., \$1700. Rolling Hills, 377-2200. A

Ford, 1957, 6-cyl., auto. trans., \$125. Manhattan Bch., FR 6-9964. A

Baby Furnishings, baby crib, stroller, playpen, \$25 or sell sep. Hawthorne, 675-6020. A

Sand Sailer, 10' long, 6' wide, front steering, \$150. P.V. Pen., 377-5862. A

Condominium Apt., 3-bdrm, 2-bath, improvements, \$18,500. Wilmington, 834-8995. A

Piano, blonde spinet, Kohler & Chase, upholstered bench, \$450. L.A., 645-7931. A

Jacket, black broadtail, w/black double mink collar & cuffs, size 10, \$225. L.A., 762-9397. A

Buick Le Sabre, 1961, auto. trans., p/s, p/b, r/h, o/size w/s/w tires, trailer hitch, \$995. Torrance, 371-6240. A

Radial Saw, Delta Rockwell 10", complete w/stand, 2 blades, 1½ hp dual voltage motor, prof. contractor's model, cost \$395, \$225. P.V. Pen., 377-6434. A

Cabin Cruiser, 19½' Glasspar, clubmariner, Volvo inbd-outbd., trailer, \$3795. Manhattan Bch., 374-7290, 374-3164. A

Hollywood Bed, mattress, box springs, metal frame w/casters, \$20. Box 201. A

Surfboard, Dewey Weber, 96.00 long, 22½" wide, stock fin, med. rails, 2" balsa stringer, orig. owner, \$70. Hawthorne, OS 6-3792. A

Sewing Machine, portable, Montgomery Ward, used very little, \$25. Long Bch., GA 3-1363. A

Chevrolet, 1958, 4-dr. sedan, 348 eng., p/s, r/h, new Powerglide trans., brakes, starter & tires, \$450. L.A., AX 4-0727. A

Chevrolet, 1958, p/s, auto. trans., V-8 eng., push-button radio, heater, \$495. Hawthorne, 676-4837, 676-9989. A

Trailer, 40', 1953, ABC, 2-bdrm., bath & shower, \$2000. Hermosa Bch., FR 2-6556, 393-4389. A

Metropolitan Museum Seminars in Art, 24 vols., complete w/288 color prints, orig. cost \$100, \$25. P.V. Pen., FR 8-1863. A

Sunbeam Roadster, 1963, r/h, wire wheels, new tires & paint, \$1200. L.A., MI 5-4163. A

Corvette, 1963 Sting Ray, fastback, 4-spd. stick shift, Spec. handling package, hvy. duty shocks, many extras, Vibrasonic AM radio, rear speakers, \$2800. Lawndale, OS 6-6818, OS 6-5425. A

Home, ocean view, 2400 sq. ft., 4-bdrm., family rm. & living room, lge. patio, near schools, \$49,500. P. V. Ests., FR 5-4049. A

Power Lawnmower, reel-type, Sears push & start, 18", 6 blades, cost \$125, \$60. Venice, EX 1-2040. A

Fiat, 1953 Topolino, convt. coupe, 4-cyl., o/head valve, collector's car, \$500. Riverside, 689-7678. A

For Sale

R-3 Lot, in Palm Desert, 155x115, ½ down, \$18,500. L.A., 472-2722. A

Volkswagen, sedan, 1965, white walls, orig. owner, \$1575. Inglewood, 673-1589. A

Wanted to Buy

Complete set of works of Jules Verne. Hawthorne, OS 6-5253. B

Piano, spinet-type, reasonable. Fullerton, 528-6914. B

Sewing Machine, complete w/max. gadgetry, prefer Singer, reasonable. Hawthorne, 679-2488. B

Radio Equipment, Motorola, GE or RCA units for use on 2 meters, unconvtd. 150 to 170 mc, mobiles &/or base stations acceptable. Whittier, OX 3-4177. B

Trumpet, cornet, or flugel horn in good condition, reasonably priced. Pico Rivera, 695-1445. B

Drill Press & jointer for home workshop. Box 202. B

FREE (To Be Given Away)

Palm Trees, 3 miniature. Torrance, 327-4585. B

Rentals Offered

Duplex, 2-bdrm., w/wall heater, 1 mile from Norair, close to schools, \$75. mo. Inglewood, PL 4-1611. E

Apt, new Medallion, built-ins, 2-bath, water paid, 2-bdrm., \$105 & \$115.; 3-bdrm., \$135. Redondo Bch., FR 2-5310. E

Apt, 1-bdrm., furn., 5 min. from Northrop, near elementary school & shopping, h/wood floors, \$89.50 mo. Gardena, DA 9-3436. E

House, 3-bdrm., 2-bath, built-ins, fenced yard, no pets, \$140 mo. or lease. Torrance, DA 9-4644, DA 7-8994. E

Apt, 1-bdrm., near Northrop, utilities paid, furn., \$75 mo. Lawndale, OS 5-9695. E

Apt, upper, unfurn., newly dec., adults, 1-bdrm., \$90; 2-bdrm., \$120. L.A., 678-1596. E

House, furn., 1-bdrm., lge. encl. yard, carport, water & rubbish pd., \$80 mo. San Pedro, TE 3-2512. E

Apts, 1 & 2-bdrm., unfurn., pvt. balcony, closed gar., soundproofed, hobby shop, hot water & trash pd., \$95 & \$125 mo. Torrance, FR 5-0867. E

Apt, 2-bdrm, built-ins, carport, play yard, \$100. Torrance, 320-2827. E

Apt, 2-bdrm, furn., gar., laundry, adults, \$130 mo. Torrance, DA 3-7544. E

Young Woman to share 3-bdrm. home, near San Diego Frwy., \$65 mo. inclus. utilities, Hawthorne, 675-4998. E

Apt, lge. 2-bdrm., pool, child OK, stove, refrig., redeco., unfurn. \$125; furn. \$140. L.A., VE 7-4036. E

Apt, 1 & 2-bdrm., furn. & unfurn., soundproofed, all elec., closed gar., some w/small fenced yd., 10 mins. to Nortronics PV, \$75-\$145. Torrance, 375-9397, 375-2091. E

Apt, delux 2-bdrm., 1¾ baths, built-ins, F/A heating, patio, gar., walking distance from Norair, \$140 mo. Manhattan Bch., 644-1442. E

House, 2-bdrm., garage, garb. disp., trash & water paid, accept 2 children, pets considered, near Northrop, \$110 mo. Rolling Hills, 370-4494. E

Apt, 1-bdrm., built-ins, 1 mile from Northrop, \$80 mo. Hawthorne, OS 6-8816. E

Apt, unfurn., 3-bdrm, 2-bath, built-in oven, gar. & pvt. sundeck, near Northrop, children OK, \$150. Hawthorne, OS 5-7938. E

House, 3-bdrm., 1½ bath, built-ins, dble. gar., 1 mile from ocean, lease/option considered, \$150 mo. Redondo Bch., 374-2433. E

Executive Home, 2050 sq. ft., 4-bdrm., dining rm., 3-bath, built-in range & dishwasher, prefer 2-yr. lease, \$395 mo. P. V., 377-4372. E

Rentals Wanted

House or Apt, 2-bdrm., unfurn., near #5 bus, in Hawthorne or Inglewood area, would like place by itself, or 1st floor if possible, approx. \$100. Hawthorne, PL 6-0564. F

Going my way?

Rides Wanted

8 a.m. — 4:45 p.m.

Rosecrans & Normandie, Gardena. Theo M. Terry, Norair, ext. 168, DA 9-1712. 5

San Bernardino Fwy. & Sunset, West Covina. R. E. Herfert, Norair, ext. 2515, YO 2-1821. 5

Manchester & Airport, Los Angeles. D. J. Hall, Norair, ext. 2385, 645-6815. 5

Fairview & La Brea, Inglewood. Louise T. McCulloch, Norair, ext. 2042, 672-2434. 5

Adams & Brookhurst or Adams & Harbor Blvd., Huntington Beach. Gene Dukette, Nortronics, ext. 438, 714-962-3763. 5

Yorba Linda or Brea on Imperial Hwy., Yorba Linda. Cecil P. Wright, Norair, ext. 1217, 528-6113. 5

Rides Offered

8 a.m. — 4:45 p.m.

San Bernardino Fwy. & Sunset, West Covina. R. E. Herfert, Norair, ext. 2515, YO 2-1821. 15

Adams & Brookhurst or Adams & Harbor Blvd., Huntington Beach. Gene Dukette, Nortronics, ext. 438, 714-962-3763. 15

Yorba Linda or Brea on Imperial Hwy., Yorba Linda. Cecil P. Wright, Norair, ext. 1217, 528-6113. 15

Melrose & Windsor Blvd., Los Angeles. C. M. Spindel, Norair, exts. 2522-2521, 465-8028. 15

NEW YEAR, NEW FACES



Northrop Recreation Clubs at four West Coast facilities are beginning their 1966 programs under the leadership of new officers. Northrop Ventura members have elected (above, from left): Joe Letteriello, Zack Silvers, Tony Piscuskas, and the new president, John Via. Seated are Bob Wilson, Industrial Relations coordinator, Dorothy Prychoda and outgoing president John Lawrence. Norair officers (left photo) are Howard Butler, Bill Lewis and Dick Cade, standing, and Bill Wareing, president, and Jack Wilson, seated. Nortronics officers for Palos Verdes and Hawthorne (below) are: Bart Williams, Dick Teel, Thelma Chambers, Joe Kalina, president, and Bob Marsh. Nortronics Anaheim officers (bottom photo) are Ed Mosher, Chet Guzinski, Bob Benedict, president, Jack Flannagan, and Elaine Steiner.



Personals

Thank You for the many cards, letters, telephone calls & the lovely gift which I received during my recent illness. VERONICA STOCKARD. L

Engineer wants roommate to share large apt., prefer part-time student, within walking distance of Norair, \$50 mo. plus ½ utilities. Hawthorne, 644-2592. L

Personals

Couple desires weekend work on sailing craft in need of deckhands, experienced, no wages expected. Hawthorne, 676-7344. L

On behalf of my family, we would like to thank everyone for their thoughtfulness & assistance during our recent bereavement. CHET GUZINSKI. L

NSL Modifies Bomarcs for Target Use

The first Bomarc A missile modified for use as a Navy target system is scheduled for launch in March by Northrop Space Laboratories under a contract awarded by U.S. Air Force Ballistic Systems Division, Norton AFB, California.

Under the contract, NSL is modifying approximately 75 of the missiles for use in surface-to-air and air-to-air target training. The Bomarcs were originally built by the Boeing Company as surface-to-air intercept missiles.

NSL also will refurbish a launching pad at Vandenberg AFB, California, and will carry out pre-launch and launch operations for Navy and Air Force target practice in the Sea Test Area of the Navy's Pacific Missile Range off the California coast.

Program Manager Con Harley heads a staff of experts assembled from numerous Northrop locations for the contract. Mr. Harley was formerly assigned as base administrator of Northrop Ventura's El Centro parachute test facility, and has experience in refurbishing and launching target drones through previous Ventura Division assignments.

Norair's W. D. McMaster is supervisor of site installation. Two more Northrop Venturans assigned to the program are L. G. Simpson, supervisor of launch operations and W. F. Masters, supervisor of flight operations.

The contract is for a three-year period, with an option for an additional two-year time span.

The missiles are in storage at Yorktown, Virginia. NSL will repair their instrumentation and install flight terminators, scoring and tracking systems and ballast packages. Their radio-controlled guidance system will also be modified.

After the first launching in March, the missiles will thereafter be launched on an average of two a month.

The Bomarc A has a speed of Mach 2.5 and a 200 nautical mile range. It can reach an altitude of 65,000 feet. With a wing span of 18 feet and length of 47 feet, its launch weight is 15,000 pounds.

CONSULTANT CONSULTS



General M. J. B. Maneckji (center), Northrop consultant in India, chats with Stiles Burke, chief of International Programs (left), and H. E. Riggins, vice president—Administration, during the general's recent visit to Northrop Ven-

tura. General Maneckji was briefed on Division capabilities in such areas as steerable parachutes, aerial targets and aerial reconnaissance systems.

APOLLO

(Continued from page 1)

tests, the Northrop landing system has been tested nearly 100 times in air drops at El Centro, California.

During one of the abort tests, an oscillating spacecraft severed lines causing loss of one of the main parachutes. Even so, the spacecraft landed without damage, proving that two chutes could do the job.

As a result of the tests, however, modifications were made to stabilize the descending spacecraft before main chute deployment.

The White Sands test series began November 7, 1963. The test proved the ability of the launch escape system to work in an emergency before launch while the spacecraft was still on the launching pad.

The second test, May 13, 1964, simulated an emergency in the high stress, high speed region.

On December 8, 1964, the command module successfully escaped its booster in the high pressure area.

A planned high altitude launch May 19, 1965, turned into a real test when the boost vehicle malfunctioned causing a premature, low-altitude abort.

A second pad abort test June 29 affirmed the design of canards (wing-like surfaces) to turn the command module blunt end forward. It also tested successfully the boost protective cover and dual reefed drogue chutes to help stabilize the craft.

PIONEER: Phil Chase Was Early Advocate of Conejo Valley Site

(Continued from page 1)

living.

Before long, however, he was back in the aircraft industry, this time with the old Northrop company, which later became Douglas El Segundo. There he met Jack Northrop. Three months after Mr. Northrop formed his own company, Phil also moved into the antiquated, yellow hotel which had become headquarters for Northrop Aircraft Company.

There were eight employees, excluding Mr. Northrop and the other officers, when Phil signed on as director of Materiel and Purchasing. One of his early jobs was to participate as one of the team in making plans for building the original Northrop plant.

Meanwhile, on an upstairs floor of the converted hotel, sometimes called the "Yellow Peril," a mockup of the Flying Wing was being put together.

The war brought contracts for P-61 fighters—nicknamed the "Black Widow"—and prime subcontracts for the B-17 bomber.

"In those days," Mr. Chase said, "we had one aim, one goal: to make something of aircraft."

After the war, Phil went into business for himself and later bought a cattle ranch in Oregon.

"After two years on the ranch, the isolation was too much for my wife and I, and the lure of aircraft was again overpowering," he reminisced.

The Chases moved back to Southern California and, in 1951, Phil was back with Northrop as buyer on the Snark program.

In 1952 he moved to Northrop Ventura's former location in Van Nuys, where he headed up Materiel.

Mr. Chase was one of the first to propose moving the facility to another location such as the Conejo Valley to alleviate operational hardships in Van Nuys. The division was housed in 23 scattered buildings when he began developing statistics to prove the advantages of the move.

He became one of three principal authors of the proposal to relocate, and when Northrop management gave the go-ahead, he became the focal point of plans and layout of the new plant.

The outdoors is still very much a part of Mr. Chase's life. He devotes his leisure hours to hunting and fishing around Big Bear lake, and is working on his "retirement home" there.

PANEL

(Continued from page 1)

moderator.

"We think this program for our first 1966 meeting is a good step toward the Club's theme of the year, which is improved communications between top management and the Club membership," Mr. Young said.

German AF To Use T-38 Trainers

The Federal Republic of Germany and the United States have jointly announced plans to provide all German Air Force jet pilots with supersonic training.

To accomplish this, the German Air Force is buying 46 Northrop T-38 Talon 800 mile-per-hour jet trainers and will conduct its entire student pilot program at Sheppard Air Force Base, Texas, starting in August 1966.

Germany is buying a quantity of subsonic U.S.-built jet trainers for the initial phase of the student pilot program. Student pilots will then advance to the faster-than-sound T-38.

The program will be patterned after the U.S. Air Force pilot training program. The U.S. Air Force has been providing supersonic training since 1961 and already has more than 600 Northrop T-38 jets in service at Air Training Command bases.

The new German pilot training program will substantially reduce the training time and costs for the student pilots while at the same time helping to reduce the balance of payments for the United States. By conducting the program in the U.S., the German Air Force will be able to take advantage of better flying weather and greater training space which has hampered the program in Germany.

Cost of the Northrop supersonic T-38 jet trainers is estimated at \$27 million and approximately \$2 million for initial engines.

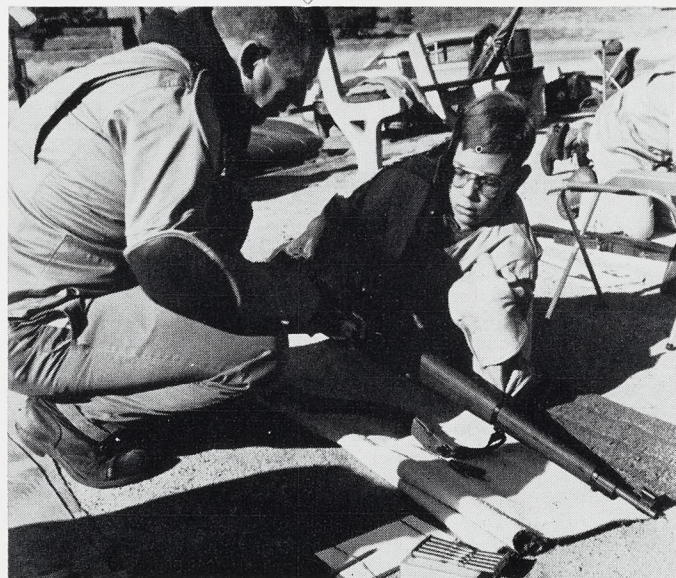
Two Teams Enter Edwards Match

Two teams from Northrop Ventura Rifle and Pistol Club will shoot February 12 and 13 in an invitational rifle match at Edwards Air Force Base.

Joe Letteriello, club commissioner, said the eight who will shoot expect tough individual competition from the military personnel who will represent Pendleton and El Toro Marine Stations, the Navy in San Diego, and Edwards AFB.

In team events, civilians do not compete directly with military shooters.

The expert team from Ventura will include Mr. Letteriello, Jerry Lanahan, Chuck Lee and Keith Kinsey. The marksmen will be Wade Tilley, John Morrison, Mrs. Chuck Lee and Bill Ward.



It's quite a trip to San Fernando Valley Gun Club shooting range in Saugus, especially if you must rise before dawn to be on firing line at 8 a.m. But some 15 members of Northrop Rifle and Pistol Club made it to begin 1966 season. As members of San Fernando Valley winter league, December through May, shooters get out rifles every fourth Sunday. Despite months without team shoot, some of scores, out of possible 150, were pretty good. For example: Jerry Lanahan, 143; Wade Tilley, 136; Chuck Lee, 132; Joe Letteriello, club commissioner, 131, and Tony Rubiales, 130. Shooters start with 10 rounds

slow fire standing, then (left photo) have 60 seconds to shoot 10 rounds rapid fire. Shooting is at 12-inch target 200 yards distant. Mr. Letteriello (center photo) waits for signal to shoot 10 rounds sitting. Beginning rifleman Bill Tilley (right photo) receives advice from dad, Wade Tilley, before shooting separate from club. Expert team included Mr. Letteriello, Mr. Rubiales, Mr. Lee, Mr. Lanahan and Bill Ward. Two marksman teams included Charles Knapp, Ed Burd, Ed Frangos, John Morrison, Mr. Tilley, Dave Coe, Buzz Correy, Vincent Riley, Gene Linhart and Marvin Schuler.

NORTHROP NEWS

NORTHROP VENTURA

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25-YEAR SERVICE AWARDS MADE TO WARNER, SPIES

Two men who work thousands of miles apart have become eligible for their 25-year service awards at Northrop Ventura.

Twenty-three other Northrop Venturans are marking their 20, 15 and 10-year anniversaries.

The two 25-year award recipients are Richard M. Warner, director of Aero Instrument facility, North Hollywood, and Robert E. Spies, on duty in Okinawa with Flight Operations.



Mr. Emerich

Carl F. Emerich completed his 20th year with Northrop.

Mr. Warner received his three-diamond pin from George F. Douglas, Corporate vice president and general manager, Northrop Ventura, early in January. He was the first pin recipient in the new year.

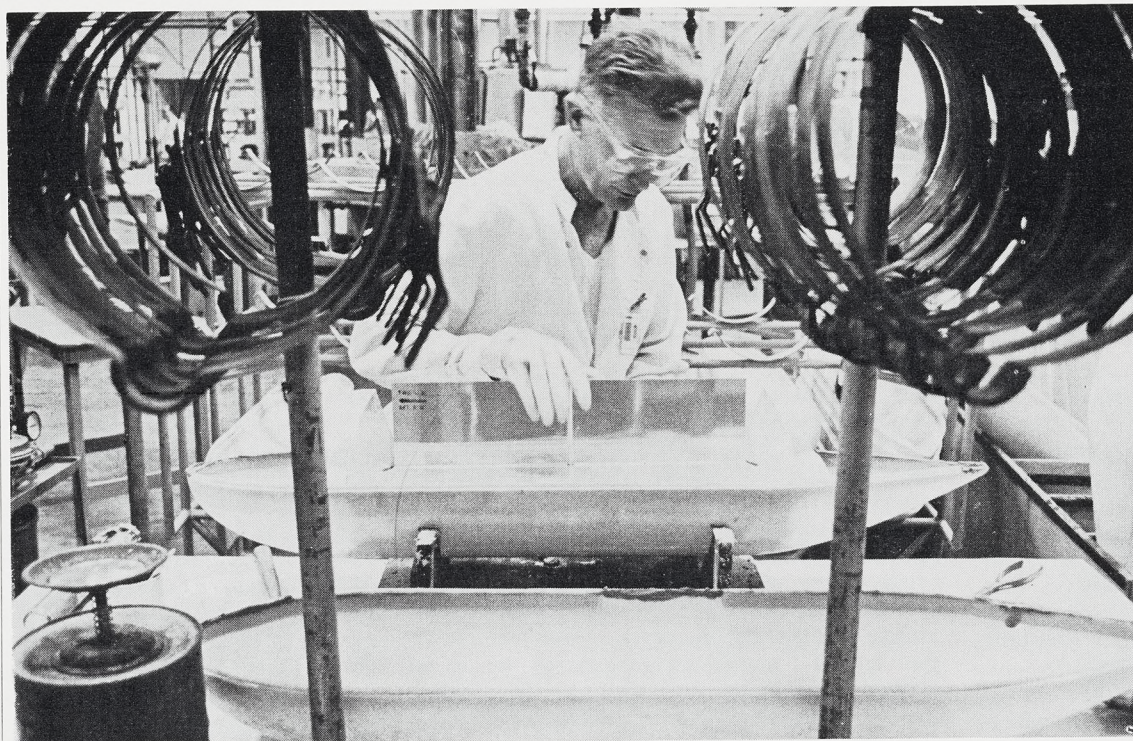
Director of Aero Instrument since the fall of 1964, Mr. Warner has held managerial positions in manufacturing, quality control and engineering. At Ventura he has served as program manager on targets and drones. Prior to that, at Norair, he was on the staff of the manager of site activation.

He served at Cape Kennedy as chief of Field Operations for the Snark program and at Holloman Air Development Center, New Mexico, with the Snark program. As an engineering representative for Northrop's P-61 night fighter he was stationed at various locations in this country and Japan.

Mr. Spies, who returned from Okinawa for a brief Christmas vacation, also received his pin from Mr. Douglas.

Since he started his work in drone flight operations in July 1961, he has traveled each year from Korea to Okinawa, Taiwan and Hawaii.

Before that he spent two years
(See AWARDS, page 8)



Jim Covington, plastics worker in Northrop Ventura's Production Operations Department fabricates fuel tank for AQM-38A target drone, a basic inventory item of U.S. Navy. Unmanned aerial systems and subcontract work, major por-

tions of which involve the plastics fabrication section, were listed by Division department managers last week as two of major product areas in the coming years.

Industrial Relations Offers New Services

Additional emphasis is being placed on the employee benefit and cost reduction programs at Northrop Ventura, Rex Fairless, director of Industrial Relations, has announced. Two new personnel representatives in Industrial Relations are assisting in the augmented efforts.

John Via, formerly with the Ventura engineering model shop, has been assigned to advise Venturans in the details of benefits available to them.

Ken Geller, Division value analyst and now also personnel representative, assists employees in determining whether specialized training would increase their promotional opportunities.

He represents Industrial Relations as an industrial educational advisor to Ventura Junior College and retains his assignment in keeping employees aware of cost reduction projects.

Mr. Via also counsels employees in terms of self-develop-
(See NEW SERVICE, page 8)

Northrop Wins \$20 Million Contract for C-5A System

A contract in excess of \$20 million has been awarded Northrop Nortronics by Lockheed-Georgia Company for the doppler-inertial navigation system for the Air Force C-5A fanjet cargo carrier.

The 700,000 plus-pound C-5A is now in development at Lockheed's Marietta, Georgia plant. The plane will have a capability of carrying a 250,000-pound payload and will cruise up to 550 miles per hour.

Nortronics' contract calls for development, test and production of the system, which will be the heart of the C-5A guidance system.

Two separate, yet closely interrelated technical disciplines have evolved into the present guidance equipment. These are lightweight digital computers and inertial platforms.

Since 1948, Nortronics has pioneered in digital computer devel-

opments. These led to APAC, the world's first transistorized missile-borne digital device in 1957. Many of the men who were part of that team today form the nucleus of the Nortronics Computer group at Hawthorne.

The beginning of inertial platform technology initiated under the Snark guidance program led to this country's first all digital lightweight inertial navigation system (LINS) developed in the mid-1950's.

Highlights since then have included development of the Mark IV SINS (Ship's Inertial Navigation System) and AIMS (Airborne Inertial Measurement System), a platform attitude reference system produced for the NASA lunar landing simulator at Langley Field, Virginia.

In the latest development in the area of inertial platforms, Nortronics recently announced the first successful application of an inertial platform (FLIP) supported by fluid instead of mechanical gimbals.

The new platform offers important advantages in reduced size and weight and has a unique capability for sustaining extremely high "g" loads. It is adaptable to navigation purposes in re-entry vehicles, satellites, missiles, aircraft and ocean vessels.

"The system which we are providing to Lockheed for the C-5A is the outgrowth of all the inertial platform and digital computer technologies which we have accumulated and advanced in the past 18 years," Vice President Ross Miller said.

The C-5A will be the first cargo plane to combine both doppler and inertial systems. The system will provide aircraft position to an accuracy of one nautical mile per hour of flight.

The system will be extremely lightweight, totaling approximately 200 pounds.

Management Panel Airs Prospects

An analysis of five product areas in which the Division will specialize and a forecast of a substantial increase in sales by 1969 were among the highlights of a panel discussion by Northrop Ventura's departmental managers February 9 at the Management Club's first meeting of 1966.

Other areas of discussion included projected manpower requirements, the Division's promotion policy, management development programs, expected technological developments, profit outlook, and manufacturing potential.

Questions for the panel were submitted in advance by Management Club members.

Marketing Manager Tom Flannigan described the Division's streamlined portfolio of products, which include: unmanned aeronautical systems, recovery systems, marine systems, information systems and selective subcontract work in the Production Operations department.

Continued production of standard Army and Navy inventory items, such as the RP-76 and KD2R-5 will account for a portion of the unmanned aeronautical systems business, Mr. Flannigan said, but the product mentioned most during the evening's discussion was the NV-105 target drone now under development.

"Our business in the foreign market, both in direct sales and under licensing agreements, also is continuing to grow," Mr. Flannigan said.

Continuing programs of providing Apollo and Gemini parachute landing systems, anti-submarine warfare information systems, and development of an unmanned underwater vehicle system were discussed.

A question about disciplines and skills which will be required in support of these product areas elicited comment from each of the panel members.

Quality Control Manager Bob Young said, "We will be doing things unique and novel that we
(See PANEL, page 8)

Cash Prize Offered For Job Referrals

Employees who assist Northrop Ventura in filling openings for technical personnel can obtain cash awards for their efforts.

Openings in the engineer and operations research analyst classifications that are filled by referral will result in \$200 awards.

For the categories of association engineer, designer or senior designer, \$100 will be given.

The awards will be presented when acceptable applicants in certain required specializations join the Division and remain for at least 90 days.

More specific information about the requirements of the program may be obtained by contacting the Employment office, extension 429,

BEATS HORSEBACK

Desert Cavorting in a Sand Buggy

Take an old Dodge chassis, a Chrysler engine, Plymouth automatic transmission and Dodge differential, and mount all these on tires with 12-inch tread. What have you got?

You've got Jim Middleton's sand buggy that can be seen cavorting over the desert rocks and sand just about any weekend.

But you'll have to venture far off the highways to see Jim, supervisor of the Facility Support unit at Northrop Ventura's El Centro Field Test branch.

He, his wife Marty, and their three sons take the vehicle over any part of the desert that isn't traveled by normal automotive equipment. In fact, sometimes the country the Middletons travel looks like it might be hard to cover on horseback.

The Middleton desert chariot differs from dune buggies in that it has a body with front and rear seats and all equipment necessary to drive it on the highway.

The chassis has been altered to an 86-inch wheelbase and the engine is a 1957 330 cubic inch Chrysler. The 12-inch tread was

Photo on page 8

obtained by widening the rims and mounting 9.50 by 14 tires in front and 11.00 by 14s in the rear. For covering sandy terrain, Jim keeps the tire pressure at 4 to 8 pounds per square inch. On the road 15 to 20 psi works out better.

With a recently installed 26½ gallon gas tank, the sand buggy has a range of more than 300 miles. Just in case of trouble the

equipment includes a citizen band radio, matched by one in the Middletons' home and family car.

Recently Jim was visited by his father, Jim Middleton sr., from Woodland Hills, California, and Jim jr., his father, and his three sons, Jim, 11, John, 9, and Joe, 8, hit the trail from El Centro past Signal Mountain and then southward into the Mexican desert.

Past trips have taken the family into the isolation of the Superstition and Chocolate Mountains and into the sand dune country around Yuma, Arizona. The Middletons also have driven into the interior of Mexico for extended periods, and have covered most of the wilder parts of the southern end of the Imperial Valley.

FRINGE BENEFITS

Grievance Procedures Open Hot Line to Management

By WILLIAM LARRABEE
Vice President—Industrial Relations

Up to the present time we have been talking about fringe benefits which mean money to us and our families, such as retirement, group insurance, and savings plans. There are more of these which we will get to in the future, but a letter which I just received started me thinking in a different direction. A large oil company in Texas wrote me, stating that it had been examining grievance procedures throughout the country and that Northrop's gave the employee the very best of opportunities to present his problems to management and to correct supervisory mistakes or misunderstandings affecting his job. This brought to mind the fact that the ability to be heard and to be protected in one's position is just as important as any of the other benefits which we have at Northrop.

The reasons why Northrop goes to such lengths to protect its people are pretty clear. In the first place, your management believes that Northrop people should be treated as individuals and that whatever is important to our people is equally important to our company. Furthermore, your management knows that a worker with a grievance or problem on his chest and on which he can't get a real hearing spends more time brooding about his problem than he does in constructive work. This is plain human nature. Lastly, supervisors make mistakes just like everybody else and no one would want such a mistake to work unjustly to the detriment of the employee or result in the loss to the company of a good employee.

Therefore, the Northrop grievance procedure was set up for nonsupervisory nonbargaining-unit personnel. Every such employee is assured that he can go straight through to company top management, get a fair hearing, and if he is not satisfied with the decision he can request a hearing before an outside arbitrator, with the company paying the arbitrator's fee and expenses.

The grievance procedure is published in detail in Working with Northrop, but generally speaking here is how it works: Let us suppose that one of the people in our plant thinks he is being laid off by his supervisor improperly under the company regulations. His first impulse, of course, is to be mad and upset, but when he has thought the situation over, and not later than seven days after the event happens, he should go to his supervisor, tell him that he intends to follow the company grievance procedure and tell the super-

visor just why he thinks he is right and the supervisor is wrong.

He may do this either in writing or orally. Perhaps the supervisor will be convinced or will have another solution to the problem. In any event, the supervisor must make a decision within the next seven days. Incidentally, the employee may obtain assistance from his Industrial Relations office in connection with this first step if he so desires.

If the employee is still unhappy with his supervisor's decision, he should then go right away to the Industrial Relations people in his division who will give him some forms to fill out and will help him summarize his problem, his supervisor's decision, and the action which the employee wishes the company to take.

Industrial Relations people then go into the matter very thoroughly, consult with all appropriate sources of information, perhaps call a conference with the employee and various supervisors, and attempt to reach a satisfactory adjustment. If a mutual satisfactory solution is not worked out, then the supervisor's superior, called the "Administrative Officer", must make a decision and notify all concerned.

Let us now assume that the employee still isn't satisfied with the decision reached. He then tells his Industrial Relations people that he wishes to go before the Management Appeals Committee, thereby getting the opportunity to discuss the problem openly with the top management of the company. This committee is made up of three people.

As Corporate vice president - Industrial Relations, I usually represent our president, Mr. Jones, on the committee. The employee's director of Industrial Relations is a member of the committee. The third member of the committee is usually the head of the department concerned. For instance, in Norair, the committee might be made up of Jack Mannion, manager, Manufacturing and Materiel department; Paul Crews, director of Industrial Relations, and me. In Nortronics, it might be Frank Lynch, vice president and manager - Operations; Elmer Noonan, director of Industrial Relations, and me.

This committee really goes into the employee's problem. It listens to his case and any witnesses he wishes to bring in. It calls in the supervisor and, in short, gets every bit of information (See FRINGE BENEFITS, page 6)



BUDDING ACTRESS, 7 MONTHS, GETS FIRST PUBLICITY

Kristine Ritzke got what she went after—a Social Security Card—and captured a few hearts in the process.

Which is not bad for a seven-month-old budding actress.

Kristine is the daughter of Raymond (a Norair Materiel employee) and Jeanne (a professional model) Ritzke. Her parents decided to try her luck as a model and perhaps television actress. She needed two things: a membership in the Screen Children's Guild and a Social Security Card.

She got both, but only after creating a sensation as the youngest applicant ever to be served at the Inglewood Social Security office.

Travelers, Take Heed, Full Year Ahead

Whether your interest lies in a 15-day tour of Old Mexico or a 33-day junket around the world, Northrop Travel Clubs invite you to a 7:30 p.m. meeting February 23 at the NRC Clubhouse, Hawthorne, for further details.

Jeanne Andrecht, NRC commissioner at Nortronics Hawthorne, indicates the meeting will feature films and representatives of travel agencies affiliated with these two NRC-sponsored trips for 1966.

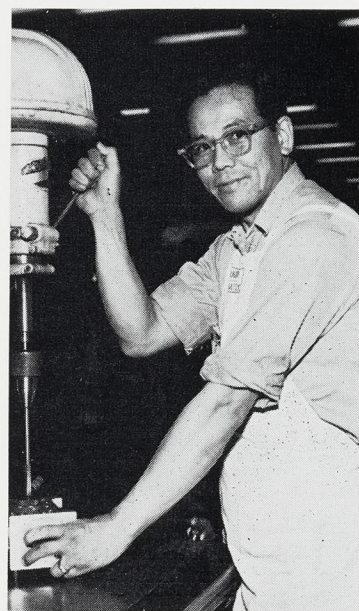
The Mexico visit begins April 29 and costs \$320 for jet air fare, lodgings and some meals.

Jet air fare, lodging, sightseeing and many meals are available for the \$1495 fee for the around the world trek departing September 2. Brochures on both trips are now available through Personnel Activities outlets.

Toastmasters Move Meetings to Cafeteria

Northrop Toastmasters Club has changed its regular Thursday (6:30 p.m.) meeting site from the Cockatoo Inn to Northrop Norair's cafeteria (the executive dining room), President Ron Klein reports.

FEATURED SUBJECT



Roy Nitta, drill press operator in Northrop Norair's Machine Operations, will be featured in a forthcoming publication of the California School for the Deaf. Mr. Nitta is a graduate of that school and has forwarded biographical information and a photograph to be used in book covering graduates who are currently working in industry.

Northrop Posters In DOD Display

Northrop Corporation cost reduction ideas will be displayed at the Contractor Cost Reduction Exhibits associated with the forthcoming series of Advanced Planning Briefings.

The annual event is sponsored by the Department of Defense with the National Security Industrial Association as hosts.

Beginning March 3 and 4 at the Sheraton Boston Hotel in Boston, the exhibition will continue to San Francisco and Washington, D. C.

The eight Northrop 30 x 40 posters will travel to the Fairmont Hotel, San Francisco, April 12 and 13, and then to the Sheraton Park Hotel in Washington April 27 and 28.

Norair Graphic Services, headed by John R. Bellevue, is preparing the artwork. In 1965 several Northrop posters were selected for display in the Pentagon following the Advanced Planning Briefings.

CASA TO PRODUCE F-5

Spanish Program Gains Momentum as Team Departs

Northrop Corporation is now moving swiftly in carrying out early commitments associated with the manufacture of F-5 tactical fighters in Spain for the Spanish Air Force.

At Northrop Norair a considerable quantity of technical data is being compiled, master tools and fixtures are being fabricated, orders are being readied for long lead-time items, and last week the vanguard of a Northrop Technical Assistance Team arrived in Spain.

Program activities accelerated recently following the reaching of final agreements.

Behind these agreements lie more than a year of detailed study, analysis, planning and discussions involving many Northrop elements working closely with representatives of Construcciones Aeronauticas S.A. (CASA) of Spain.

CASA, Spain's leading aerospace firm, is the prime contractor to the Spanish Air Force and is teamed with Northrop and General Electric (for engines) in this venture through a special licensing agreement.

This program will produce 70 supersonic tactical fighters, both F-5A's and F-5B's, for the Spanish Air Ministry

(Northrop NEWS, January 20, 1965).

The over-all program extends through 1970.

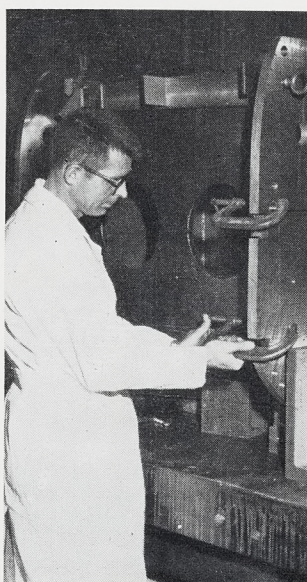
Paul Jacobs, Norair's deputy division program manager responsible for the Spanish program, said:

"In the months ahead the Spanish effort will require contributions of an exacting nature from groups and individuals in many functions—Technical, Production and Administration."



MASTER TOOLS—Fabrication of large numbers of master tools to be used by CASA is performed by J. L. Stevenson and Harvey Hemmingsen (above) and Jim Hammond (right).

Mr. Jacobs pointed out that early program requirements call for Northrop to ship "knock-down" aircraft and components to CASA. That is, initially systems, components and structures built at Norair, Nortronics and Ventura Divisions and by F-5 program subcontractors will go to Spain in much the same form and condition as F-5's currently moving between Hawthorne and Palmdale.



In the next phase complete aircraft structures will be shipped. Still later, detailed aircraft parts will follow the same route.

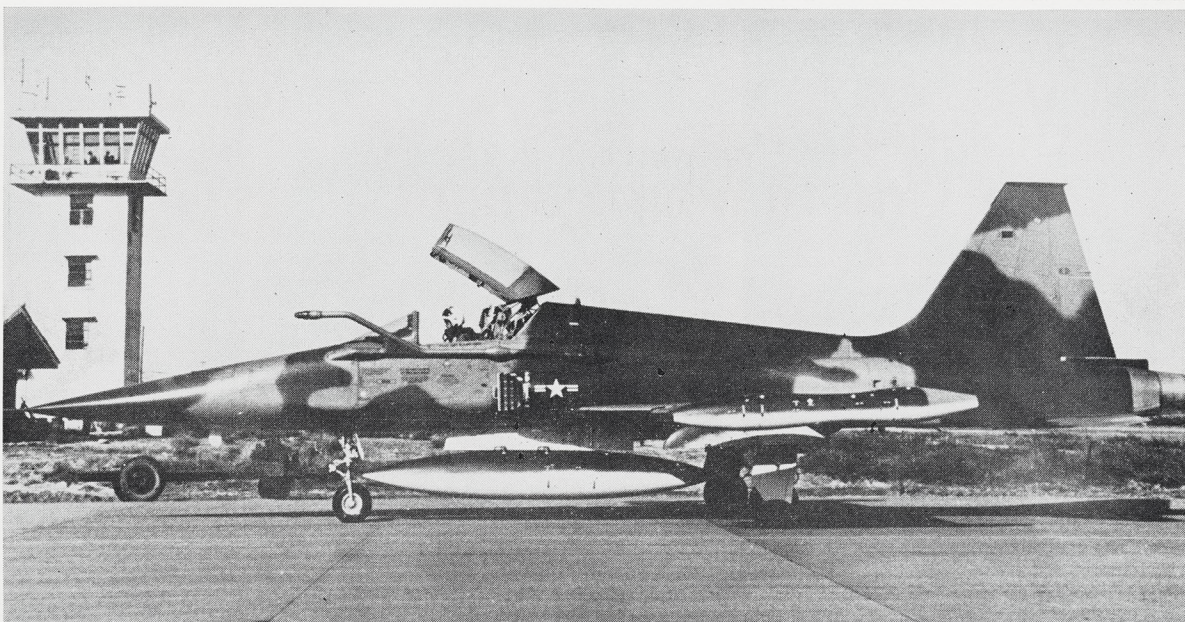
Throughout the life of the program Northrop will supply CASA with finished materials, purchased parts, aircraft equipment and selected raw stocks as required.

Juan Alonso Pesudo, CASA's F-5 program manager, and other CASA officials have worked closely with Northrop officials over the past year to work out even the smallest details of the program. Northrop's Mike Creamer, George Schnug, John Brenehan, Don Vivrette, O. P. Omley, Paul Jacobs, Gid Kelley, Mannie Gonzalez, Bill Cunningham, Scott Johnson and Fayze Fandey have led planning phases, working closely with many other Northrop individuals on the program.

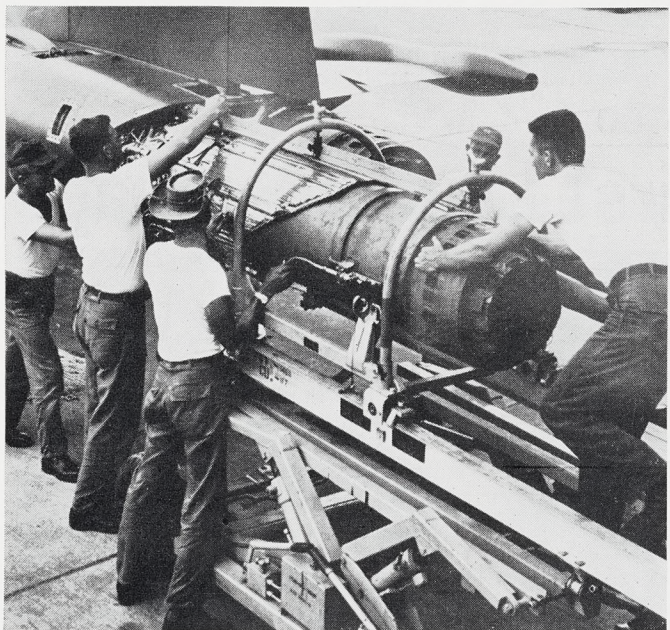
Mr. Omley, Norair's manager of International Operations department, calls the over-all program outlined in final agreements a "building block approach."

"It calls for a well-defined series of progressive steps leading to the establishment of an F-5 production capability at CASA that is identical, although somewhat smaller, to that at Norair,"

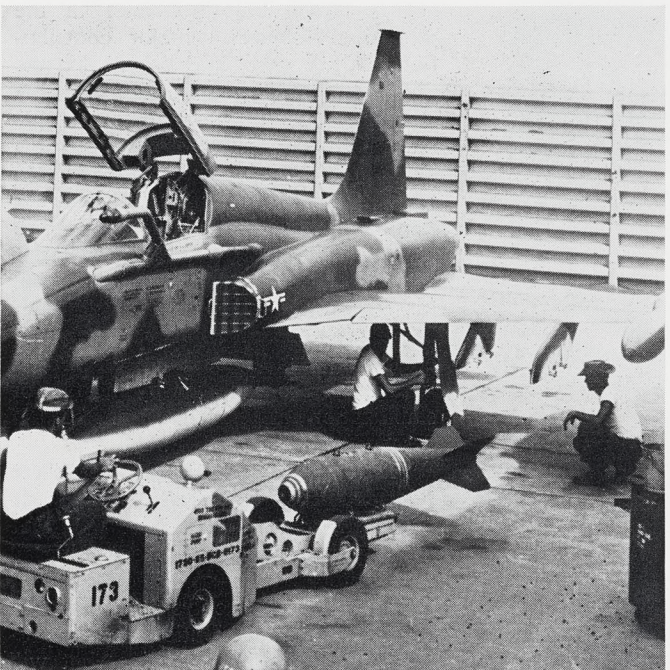
(See CASA, page 5)



Awaiting signal from control tower to take off, a Northrop F-5 in full-battle dress (above) is set for one of the more than 2000 sorties credited to the fighters participating in Project Skoshi Tiger. Planes are piloted by members of the 4503d Tactical Fighter Squadron. During his Christmas visit to Vietnam, Bob Hope (left photo) stopped by Skoshi Tiger flight-line for chat with Captain Leonard Wilson, a 4503d pilot.



A complete change of engines (above) is quick and easy. Two-engine design of F-5 has been credited by 4503d pilots with bringing them and the plane back in one piece when one engine was damaged. Turn-around time which includes getting a new load of bombs (below) takes less than an hour in most cases.



Northrop technical representatives assigned to Project Skoshi Tiger are (from left): Jim Bateson, Ralph Troxel, Clarence Johnson, Don Kindy and Bob Purcell. Ike Houts, the sixth team member, is not shown. Members of 4503d open gift packages (right photo).

Skoshi Tiger Squadron Completes 2000th Sortie Over Vietnam

Northrop F-5's in Vietnam completed their 2000th sortie earlier this month in Project Skoshi Tiger.

Captain Miles E. Withrow of the 4503d Tactical Fighter Squadron led the flight of three F-5's on a strike against a Viet Cong concentration about 46 miles south of the Bien Hoa Air Base.

According to an Air Force announcement, the pilots destroyed six structures and damaged four others during the mission.

The planes arrived at Bien Hoa October 23 of last year and within hours after setting down, two of the planes were away for their first mission.

Since their arrival in Vietnam, Skoshi Tiger pilots have been credited with destroying about 1500 buildings and damaging more than 1300 others.

On the same day the 2000 sortie was being flown, Northrop President and Chairman Thomas V. Jones was praising the Air Force's logistics support of Project Skoshi Tiger.

Mr. Jones said that the Air Force Logistics Command has accomplished "a mission that could easily have been described as improbable."

Writing to General Kenneth B. Hobson, AFLC commander, Mr. Jones pointed out that the deployment of the F-5's to Vietnam was carried out with no deterioration to the still expanding Military Assistance Program, the primary user of the Northrop tactical fighter.

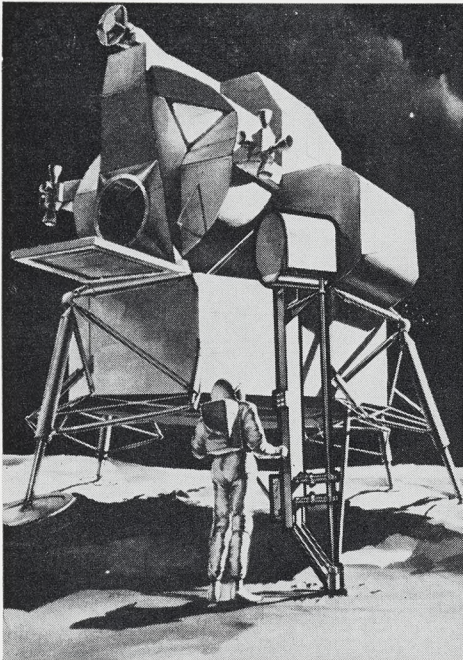
"Support of Skoshi Tiger to the range and depth required in the extremely short span of time from inception of the program to the on-site operational ready date was a mission that could easily have been described as improbable. To have all unit mobility packages deploy 100 percent filled, and the backup support package over 97 percent complete, is the finest display of logistical support that I have ever experienced," Mr. Jones said.

Mr. Jones also extended his congratulations to Colonel Cletus Wray, system support manager for the San Antonio Air Materiel Area, Kelley Air Force Base, Texas, and Major Robert Alexander, F-5 project officer. SAAMA, commanded by Major General Frank E. Rouse, is responsible for worldwide logistics support to the F-5.



Two faces of Skoshi Tiger reveal sense of humor is retained in war-time environment by men of 4503d. Huge sign (above), which graces supply tent at air base in Vietnam, was borrowed from Humble Oil & Refining Company, originator of one of many commercial campaigns involving tiger image. A 4503d pilot (below), who is pointing out damage to plane from ground fire, wears official Skoshi Tiger emblem on his sleeve which doesn't look quite so friendly.

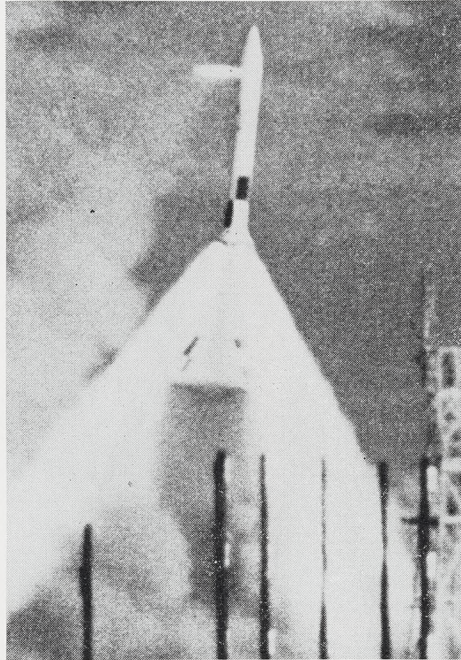




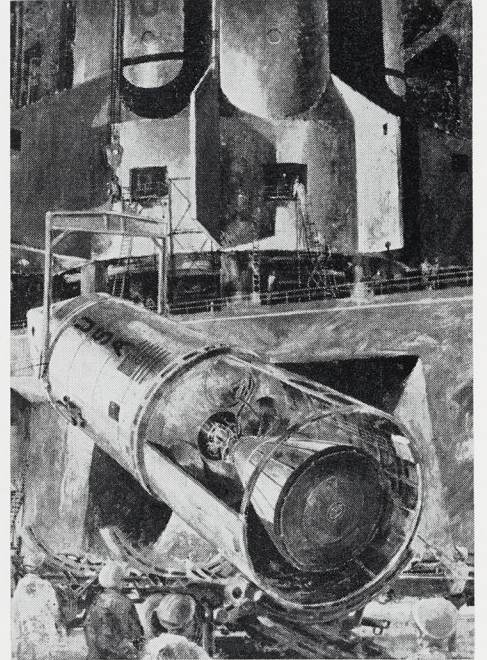
Northrop's lunar drill concept (outlined in black) shown attached to Lunar Excursion Module (LEM).



Delores Caldera of Northrop Ventura's Parolab is framed by Apollo parachute.



Launch escape motor containing Q-ball, pulls Apollo flight model to safety in abort test.



Mated command and service modules of Apollo spacecraft are elevated to top of giant Saturn.

SATURN 1B BOOSTER GETS TRIAL, TOO

Apollo Edges Closer to Moon With First Launch at Cape

On the heels of President Johnson's space report to Congress this month that major milestones are being met on schedule in efforts to get to the moon in this decade, NASA tentatively set February 22 as the date for launching the first Apollo spacecraft into space on the first Saturn 1B vehicle.

The unmanned flight from Kennedy Space Center, Florida, will extend 5000 miles over the Atlantic Missile Range with parachute recovery in the vicinity of Ascension Island.

Northrop Ventura, developer of the Earth Landing System (ELS) for Apollo, is one of 14 major subcontractors, and Northrop Nortronics and Northrop Space Laboratories are supplying components and technical support which range from sensors to concepts of complete lunar logistics packages.

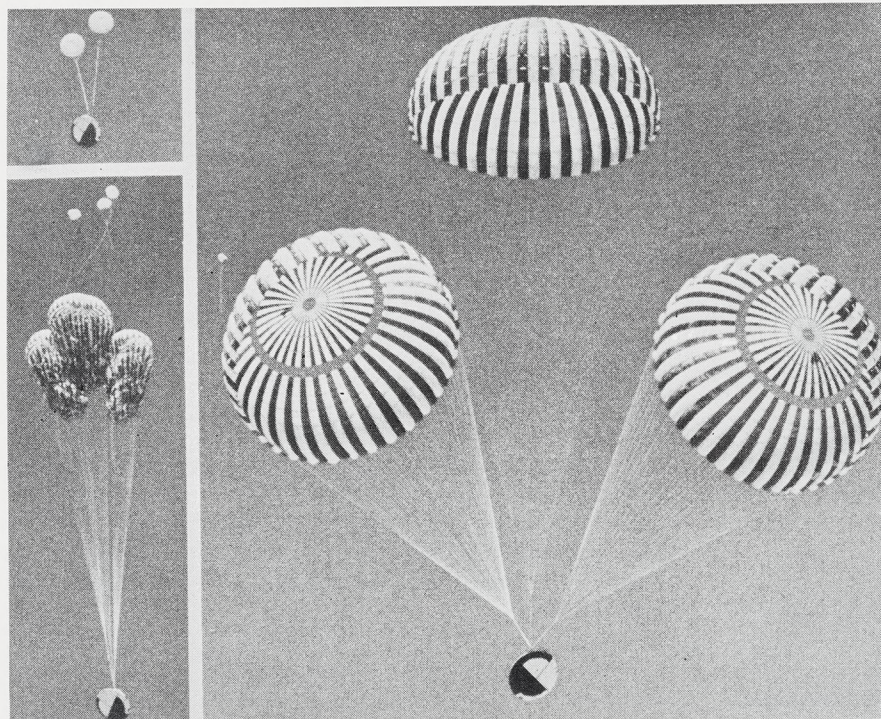
The flight this month by Spacecraft 009 will be flown unmanned in the first test of a series to prove Apollo's capability to withstand the 5000 degree re-entry temperatures expected on a lunar flight.

North American Aviation is prime contractor for the Apollo spacecraft, and Chrysler Corporation is prime contractor for manufacture of the Saturn 1B booster.

Northrop Space Laboratories is about mid-way through a program for NASA to assess the effects of vacuum exposure for extended periods of up to 90 days and re-entry on the Apollo heat shield material.

The program is a joint effort of NSL's Space Materials and Plasma Science laboratories. A plasma jet, designed and built by Northrop, simulates the heat of re-entry on test samples in a vacuum chamber.

The Space Labs are also engaged in a four-month design study contract on



Three main steps in Apollo Spacecraft 009's earth landing system are shown in these photos taken with telescopic camera during high altitude drop test at El Centro, California.

an experiments pallet to fly aboard Apollo missions. The contract calls for NSL to design, develop detailed specifications for and produce a mock-up of a pallet to be placed in the Apollo spacecraft service module.

Flights using the pallet, which will allow for additional scientific explorations during lunar journeys, are scheduled to start in 1968.

Northrop's pallet design is competing with those of three other firms for a major NASA contract.

At Huntsville, Alabama, where NSL maintains a technical support facility, Northrop has performed numerous studies of launch systems, lunar logis-

tics payloads, conceptual designs and system analyses which relate to both the current phase of the Apollo program and what is known as the Apollo Applications program.

A Huntsville team is presently developing a unique and compact drill with which future Apollo astronauts may sample the lunar crust to depths of 100 feet or more.

Northrop, along with one other industrial contractor, will develop and manufacture an engineering model of the compact drill under contract to NASA's Marshall Space Flight Center in Huntsville.

The geological research tool will be

used in the Apollo Applications program for manned lunar exploration after the initial manned landing.

Research into man's physical capabilities on the moon is in progress at NSL Hawthorne, using a 1/6 lunar gravity simulation facility.

NSL also is conducting research on support restraint systems under contract to NASA. Crew seating and crew protection in spacecraft are being studied. Northrop scientists are continuing research into methods of thermal transport and combinations of thermal transport with the support restraint systems. This work is leading to the development of new types of suits for space crews.

Since much of Northrop's work in support of a manned lunar landing will not be applicable until later in the program, Northrop's major contribution to the 009 launch will be the parachute recovery system.

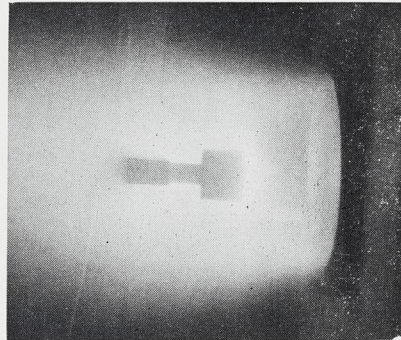
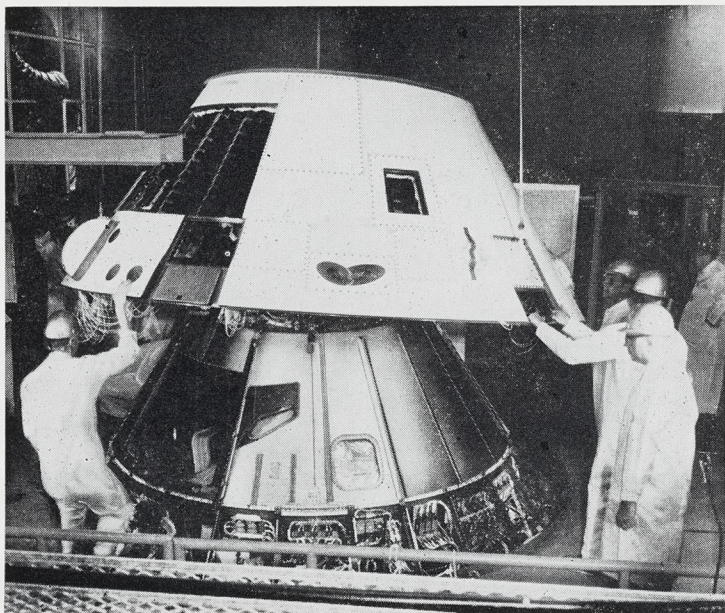
Eight separate parachutes are involved in the landing sequence which begins at approximately 25,000 feet while the spacecraft is descending at approximately 18,750 miles per hour.

At 25,000 feet, a barometric pressure switch fires an explosive charge to jettison the apex heat shield over the parachute compartment. Two seconds later, two 13-foot diameter drogue parachutes are deployed by mortar for stabilization and deceleration of the descending command module.

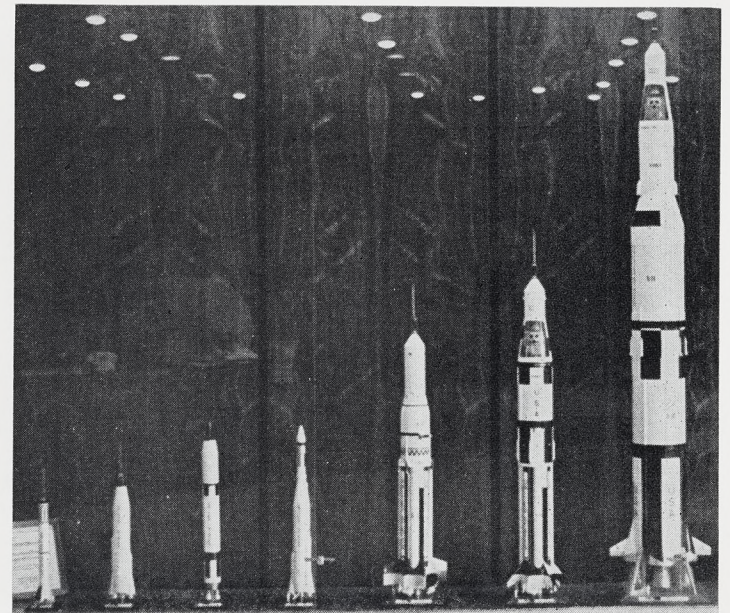
At approximately 10,000 feet, three pilot chutes, seven feet in diameter, are deployed, also by mortar. Each pilot chute pulls a main 83.5-foot Ringsail parachute from its container.

Northrop Nortronics also will be making some contributions to the program further down the line, but will have hardware involved in this month's launch, too.

(See APOLLO, page 5)



One of three sections that make up outer heat shield of Apollo spacecraft is lowered into place (left). Plasma jet gives heat shield ablative material a taste of re-entry heat (above) at NSL. Evolution of space boosters, in Cape display (right), shows steady advancement from Redstone (far left), which placed Mercury in sub-orbital flight, to Saturn V (far right) which will start Apollo on its moon voyage. Apollo, mated to Saturn 1B, is second from right.



While F-5's Scorch In Asia, 4 Shiver On Polar Flight

The recent "high flight" of four Northrop F-5 fighters to Iran was, in a way, complementary to the operation of the aircraft now under way in Vietnam, according to an Air Force release from Williams Air Force Base, Arizona.

The Viet-based squadron is operating under some of the worst heat and humidity conditions, while the Williams-to-Tehran flight was accomplished over the fog-bound, blizzard-raked North Atlantic route. It was the first time U.S. Air Force pilots had flown the fighter over the route.

The four F-5's were being delivered to the Imperial Iranian Air Force under terms of the Military Assistance Program.

The flight was commanded by Major Bill Gillette, a veteran of 19 North Atlantic crossings since 1953. Other pilots were Captains Dick Lougee, Jan Holley and Bill Gilbert.

Stops on the trip included Langley Air Force Base, Virginia, where the pilots received their final briefing, Loring AFB, Maine, Goose Bay, Labrador, Keflavik AB, Iceland, Prestwick, Scotland, Chateauroux AB, France, and Athens, Greece.

At Loring, the pilots were greeted with six feet of snow. Over Greenland the temperature was 30 degrees below zero.

"The aircraft were functioning properly," one of the pilots from balmy Arizona said, "but we couldn't say the same for ourselves."

On refueling and maintenance stops, turn-around time was less than an hour on most all occasions, the Air Force said.

The planes arrived at Tehran at the exact arrival time specified in the advance itinerary.

The pilots, assigned to the 4441st Combat Crew Training Squadron, Tactical Air Command, returned with praise for the F-5 "which is proving itself at all times and under all conditions," the Air Force release said.

QUICK RESPONSE



Ventura County firemen, responding to a Northrop Ventura alarm in three minutes, found that the Division's Fire Brigade already had an aluminum particles fire under control. Brigade captains Buck Gilmore and Ray Escott were first on the scene. It was believed the fire started when sparks from a metal saw ignited a box of fine aluminum powder.

NSL Selects Bell For Subcontract On Pallet Study

Northrop Space Laboratories which is now carrying out a four-month design study contract for an experiments pallet to fly on Project Apollo missions, has selected the Bell Aerosystems Company of Buffalo, New York, to assist in extra-vehicular operations studies.

Bell Aerosystems will assist in performance of tasks related to crew and mission integration; human factor studies; analysis of astronaut utilization training; and simulation activities.

The pallet, to be placed in the NASA Apollo spacecraft service module, will house scientific, technological and engineering experiments to be carried on missions of up to two weeks' duration, beginning in 1968.

After review and evaluation of the design studies, NASA plans to select an industrial contractor to develop the Apollo experiments pallet flight hardware under a cost-plus-incentive-fee contract.

Another major subcontractor in the Northrop study is Radiation, Inc. of Melbourne, Florida, responsible for data management and communications systems.

AD ASTRA PER ASPERA

AF Symposium Held at Hawthorne; Software Breakthrough Told in N.Y.

By the Northrop News Staff

A classified technical symposium, sponsored by the Air Force Systems Command in conjunction with the annual winter conference of the Institute of Electrical and Electronic Engineers, was held earlier this month by Northrop Norair.

The regular WINCON technical sessions, co-sponsored this year by the IEEE Los Angeles section and the Aerospace and Electronics Systems group, were held at the International Hotel.



Mr. Lyons

Frank Lyons, chief of F-5/T-38 Electronics Systems and AGE group, is vice chairman for West Coast activities in the 10,500-member, international AES group. He served as ex-officio member of the convention and was advisor to the Los Angeles section conference committee on technical aspects of the conference.

USAF Major Kenneth Cook was classified symposium director.

More than 1300 members registered for the classified sessions which were held in the Product Display building at Norair. Tom Tapper of Customer Relations coordinated arrangements for use of the Northrop facility.

DAYS INTO SECONDS

Northrop engineers attending the AIAA's third Aerospace Sciences Meeting in New York discovered that eastern air travel can be as frustrating as western freeways. Especially if it's winter time.

Mickey Cahn of Norair, who combined a trip to Langley Research Center, Virginia, with the New York meeting, had his flight to Hampton snowed out, but made the trip by car. When he got ready to leave, even the roads were impassable. Two days later he finally got back to Baltimore to catch a plane for Los Angeles, but a blizzard struck there too.

Of significance at the meeting was a technical paper by Dr. S. S. Hu and M. L. Thompson of Northrop Space Laboratories' Huntsville facility which described a major advance in solving spacecraft guidance problems.

Dr. Hu, director of Research and Analysis section, compared the present method of calculating guidance parameters, which require months of planning in advance of a space flight.

"During the flight, guidance is controlled by a ground station — not by the astronaut. Often to calculate a change in the guidance parameters may take days or weeks, possibly months to complete," he said.

"Our approach has enabled us to program the necessary change and receive a corrected answer in three seconds using an IBM 7094 computer."

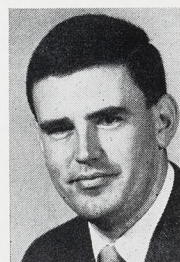
"This is a step toward using an onboard computer to solve guidance problems. Such a capability would allow the astronaut to fly his spacecraft rather than react to ground commands," Dr. Hu said.

Mr. Thompson, the paper's co-author, is engineer in charge of the computer programming unit at Huntsville.

DR. PEPPER JOINS RESEARCH

Dr. Roger Thomas Pepper, a metallurgist who came to the United States from England in 1960, says that he didn't know when he crossed the Atlantic that he would have to contend with a lifetime of ribbing about his name.

But the good-natured authority on nuclear power and powder metallurgy, presently a principal investigator in the Materials Research group at Northrop Norair, has discovered that the ribbing soon subsides.



Dr. Pepper

Dr. Pepper joined the company last October and is responsible for research programs on intermetallic compounds and dispersion-strengthened metals.

Purpose of the studies is to develop new alloys with good strength in, for example, the temperature region of gas turbine operation.

Dr. Pepper received his doctorate in physical metallurgy from Manchester University in 1963. He came to Northrop from Minnesota Mining and Manufacturing Company, St. Paul, Minnesota. Prior to that he was a metallurgist for General Electric Company of England.

He was a research assistant and member of the academic staff at Manchester University for three years during which he worked on a program to develop a "fast" nuclear reactor fueled with uranium dioxide and cooled with sodium.

AND IN CONCLUSION

Norm Laverty, associate chief — Engineering, at Nortronics Palos Verdes is a member of the review board and a technical session organizer for the 1966 Specialist Conference on Guidance and Control of the AIAA, now scheduled for August at the University of Washington.

J. P. Campbell of Norair's Electronics Systems Research group presented a paper on Infrared Signature and Suppression for F-5 Aircraft at the Fifth Meeting of IRIS Specialty Group on Infrared Countermeasures in Los Angeles, sponsored by the U.S. Naval Ordnance Test Station at China Lake.

APOLLO

(Continued from page 4)

The Saturn booster and the Apollo launch escape system both contain a Nortronics-developed Q-ball sensor, a unique and highly accurate air data sensor that measures vital aerodynamic pressures relative to the ascent and descent of a vehicle.

In addition to measuring dynamic pressures, the Q-ball electrically totals its measurements and routes results to the command module for telemetering to the ground.

The Division's information and display system, Vigicon, will portray the flight graphically at control centers at Kennedy Space Center and Goddard Space Flight Center, Green Belt, Maryland.

A new star-tracking system capable of providing highly accurate celestial fixes to shipboard navigation systems is being produced by Nortronics Marine Equipment Department, Needham Heights, Massachusetts, for use in the Apollo program. A star sensor for the system is being provided by the Division's Palos Verdes research facility.

And, finally, the Division's Precision Products Department at Norwood, Massachusetts, is providing gyroscopes for both the first and second stages of the Saturn 1B.

CASA: Spanish Program Picks Up Tempo

(Continued from page 2)

Mr. Omley said.

Mr. Omley noted that the scope of the program includes each necessary element from technical data through production.

Interchangeability is an oft-heard phrase associated with the Spanish program.

It means, simply, that CASA-made parts for the F-5 will fit not only Spanish Air Force aircraft, but also those aircraft built at Norair for other allied nations.

Maintaining this feature is anything but simple.

First, Northrop Norair must provide CASA with technical data that is exact to the smallest detail and it must update this material whenever changes are made. Toward this end, there are now 74 volumes of information covering such subjects as design engineering, control of engineering changes and configuration management.

There is a great number of other volumes of general reference material, including 14 which cover various types of required aircraft records alone. Copies of Improved Data Exchange

Master Files, to be provided, list more than 40,000 items. In addition, copies of more than 100 technical manuals will be furnished.

In augmenting technical data, Norair is providing master tools from which CASA will make its own production tools to ensure interchangeability.

Current Norair tool fabricating activities are centered around 20 international tooling masters that ensure proper controls over major mating points (wing-to-fuselage, flap-to-wing); 215 secondary masters to ensure interchangeability of even the smallest components; 100 plaster mockups or laminated transfers to control external airframe surfaces; and 26 bonding fixtures.

Carrying out still another major part of the program at the request of CASA, Norair has selected a 24-member Technical Assistance Team, a sort of miniature company made up of specialists in a wide range of fields—tooling, production, data processing, engineering and materiel to name a few.

Team members will spend varying

periods of time in Spain, depending upon their assignments.

To head this all-important activity, Norair management selected as its director John Breneman, a 25-year Northrop veteran with extensive background in every phase of production.

Mr. Breneman and Norair management have hand-picked the remaining 23 members from long lists of applicants. Those selected are veteran employees, versatile, knowledgeable and equipped to do many jobs under any condition.

"I feel this Team is exceptional in many respects and highly capable of representing the Northrop image in Spain," Mr. Breneman said.

Some Team members speak Spanish fluently while others have worked Spanish language training into their busy pre-departure schedules. Each has also taken time to study the customs of Spain, its people and traditions.

In Spain CASA operates two major facilities, one at Getafe, near Madrid, the other at Seville, some 300 miles away. Both facilities are modern, well-equipped and staffed with experienced technicians, engineers and management personnel.

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

For Sale

Lot, R-1. Thunderbird Country Club area, Palm Springs, 1/3 dn., \$6000. L.A., 472-2722.

Chevrolet Impala sport coupe, 1959, Hydramatic, p/s, p/b, r/h, \$665. Ingewood, OR 2-4247.

Organ, Conn Caprice, \$600. Torrance, FR 8-1350.

Tape Recorder, w/2 microphones, & 1 roll new tape, stereo or mono., record & playback. 7 1/2 & 3 3/4 spd. meter for voice level on channels, \$185. Buena Pk., LA 1-4711. A

Chevrolet, 1957 4-dr., r/h, auto. trans., low mileage, \$325. Compton, 632-3623. A

TV, Packard Bell, 19", Danish walnut console convt. to portable, \$75. Costa Mesa, 714-546-5341. A

Hudson, 1'50, \$150. Lawndale, FR 9-4782. A

Tires, mostly 8:20 x 15, some w/s/w, \$2 ea. L.A., 472-3374. A

Mirror, plate glass, 26 x 44, \$5. Torrance, DA 3-8797. A

Bicycle, girl's 26", \$20. Harbor City, 326-1409. A

House, 4-bdrm., family rm., built-ins, fireplace, landscaped, sprinklers, 10 min. to Northrop, \$32,950. Torrance, 327-2666. A

Organ, Hammond elec., dark walnut, \$300. Torrance, 370-6858. A

Wheels & knockoff hub caps, 4 chrome, for 1965 Chevrolet, \$40. Compton, DA 9-6848. A

Chevrolet Malibu SS coupe, 1964, 4-barrel, console, r/h, p/s, p/b, \$2170 or take over approx. \$88 mo. pymnts. Anaheim, 635-1686.

Honda, 1965, 250 cc Scrambler, less than 3500 miles, 9-mos.-old, \$550. Box 301. A

Bedroom Furniture, dble, bed w/utility headboard & matching 5-dwr. chest, modern, light wood, box spring & innerspring mattress, \$95. L.A., 645-7931. A

Home, 3-bdrm., 2-bath, fireplace, built-in dishwasher & stove, newly redecorated, \$27,500. Torrance, DA 9-6885. A

Language Records, Spanish, 4 12" LP records, 40 lessons w/instructions, \$4. Torrance, 323-1698.

House, 2-bdrm, panelled l/r & d/r, lge. kitchen, recently painted, patio, fenced yard, 5 min. to Norair, \$19,000. Hawthorne, 676-6930. A

Desk, modern, dk. blonde, cost \$138, \$75. Hawthorne, OS 9-2337. A

Motor Scooter, Cushman Husky, w/side car, new tires, \$75. Lawndale, 370-3230. A

Folk Guitar, nylon strings, \$25. P.V. Ests., 377-3548. A

Ping Pong Table, 5 x 9', 3/4" plywood, \$10. Lawndale, OS 9-0876. A

Farm Tractor, International, rebuilt eng. 72 hrs. running time, \$300. Compton, 321-9557. A

Own-Your-Own Apt., 1-bdrm., lge. glassed in lanai, built-ins, patio, heated pool, gar. w/storage rm., ample guest parking, FHA 4 1/2% mortgage, pymnts. \$99 mo. incl. maintenance & replacements, low down, \$15,000. Hollywood, 467-9201, 465-5314. A

NSU Prinz sedan, 1959, \$175. Hawthorne, 675-4505. A

Pickup & teardrop camper, Dodge, 1/2-ton, 1961, r/h, auto. trans., dual battery sys., new 6-ply tires, intercomm, V-8 eng., camper is 8' non-cabover, many custom extras, \$1495. Torrance, 371-8701. A

Shotgun, 12-ga. High Standard, pump action, Flite King field model, full choke, \$60. Hawthorne, OS 9-5874. A

Acreage, 2 1/2 acres, Antelope Valley, \$15 down & \$15 mo., \$1500. Torrance, FR 8-1026. A

VW, 1964 sedan, new tires, battery, brakes, & plugs, \$1395. Downey, TO 9-2700. A

Chevrolet, 1955, 327, 4-spd., 4.56, slicks, T-bars, new paint & int., \$1050. P.V. Ests., 746-9376, 375-9747. A

Ford, 1957, 2-dr. Fairlane 500, p/b, p/s, new tires, \$300. Torrance, 320-5552. A

Skindiving Equipment, aqua lung regulator, 2 wet suits, fins, masks, weight belts, \$75. Manhattan Bch., FR 9-3003. A

Renault, 1959 4cv, 5-new tires, new brakes, cylinders, starter, & fuel pump, 200 miles on eng., \$195. Montebello, 724-4300. A

Plymouth, 1957 4-dr. Savoy, good tires, newly o/hauled, new paint, \$300. Yorba Linda, 524-0857. A

Mustang, 1965, 2-dr. h/top, V-8, 225 hp Cruise-o-matic, factory air cond., console, r/h, \$2495. Torrance, 371-5229. A

Chevrolet Super Sport, 1964, convt., V-8 327 cu. in. 4-spd., r/h, Astro chrome wheels, \$2200. LaHabra, 213-691-0106. A

Studebaker station wagon, 1957, \$200. Hawthorne, 679-6581. A

Volkswagen sedan, 1965, 11,500 miles, \$1750. Garden Grove, 714-530-1237. A

Rifle, ArmaLite aircraft survival .22 cal. semi-auto, demountable, \$30. Torrance, DA 6-7232. A

Cabin Cruiser, 1962 23' Trojan, 185 hp in-board V Interceptor eng., sleeps 4, incl. stove, sink, elec. bilge blower, ship-to-shore radio, \$3600. L.A., RI 8-0208, GR 4-0812. A

Cadillac sedan Deville, 1956, full power & air, \$400. Stanton, JA 7-5337, OS 5-3643. A

Corvette, 1960 h/top, r/h, 4-spd., fuel injection, positraction, h.o. clutch, chrome wheels, \$1535. Pacific Palisades, GL 4-7252, GL 4-3931. A

For Sale

Buick, 1956, r/h, w/s/w, \$130. Torrance, 328-9049. A

Youth Bed, Baby line, \$20. Hawthorne, OS 6-1673. A

Chevrolet Biscayne, 1961, 6-cyl., auto. trans., r/h, \$650. Inglewood, 678-1621. A

Morgan, 1960, alum. body, Nardi wheel, comp. exhaust, r/h, \$1295. Santa Ana, 714-LI 4-6135. A

Chevrolet Impala, 1959, 4-dr., 8-cyl., auto. trans., r/h, \$500. L.A., 294-5998. A

Hollywood Bed, single, w/new turquoise & green custom coverlet & bolsters, \$70. L.A., 656-0201. A

House, 2-bdrm., lge. lot, dble. detached gar., new carpeting & linoleum, GI loan, \$23,950. Manhattan Bch., FR 6-6848. A

Cabin Cruiser, 19 1/2', Glasspar club mariner, Volvo 1/0 w/trailer, \$3795. Hermosa Bch., 374-7290. A

Organ, Hammond model B-3 w/HR-40 tone cabinet, blond, \$1800. P. V. Pen., 377-5415. A

Stove, Westinghouse elec., clock-timer, 40" oven w/glass window, \$45. Huntington Bch., 897-8201. A

Drafting Machine, Universal Boardmaster, 30" arms, new model w/little use, \$75. Redondo Bch., FR 6-6415. A

Sailboat, sloop rigged, fiberglass hull, centerboard, Romeo class, 13', cartop carrying rig, dacron sails, access., \$375. Torrance, FR 4-4953. A

Chevrolet, 1953 convt., std. trans., good top & tonneau cover, new shocks & front springs, \$195. Torrance, 327-4585. A

Chrysler 300, 1962, 42,000 miles, new brakes & tires, p/s, p/b, 6-way p/bucket seats, radio, \$1800. Fullerton, 526-4168. A

Chrysler, 1957, h/top, full power, new paint, battery, brakes, smog device, \$295. L. A., RI 8-5864. A

Camera, Fotron, completely auto. electronic brain, mag. load, built-in flash, leather carrying case, film, \$50 & take over pymnts. or \$300. Hawthorne, 328-3749. A

Volkswagen, 1964, 1500 S sedan, 19,600 miles, \$1750. Lynwood, 638-9954. A

Golf Equipment, custom-made Stan Thompson woods set of 4, black leather head covers, lge. black golf bag & cart, \$45. Gardena, DA 9-3436. A

Bed, dble., box spring, mattress, bookcase headboard & matching dresser, antique grey, \$50. Inglewood, OR 2-8468. A

Pickup Truck, 1946, \$100. Gardena, 329-9484. A

Osterizer, 3-spd. pushbutton, delux model, \$30. Hawthorne, 644-3229. A

Baby Crib & mattress, dble. drop sides, \$15. Long Beach, HA 1-6958. A

Oldsmobile 98, 1956, convt., \$150. Torrance, TE 5-6221. A

Volkswagen, 1960, low mileage, \$800. Hawthorne, 679-7662. A

Ford Station Wagon, 1957, 2-dr. ranch wagon, 245 hp V-8, r/h, trailer hitch, orig. owner, \$245. Rolling Hills Ests., FR 8-5175. A

Chevrolet, Parkwood station wagon, r/h, Powerglide, \$565. P. V., FR 5-0867. A

Air Conditioner, Mark IV, for 1960 Chevrolet station wagon or equiv., brackets & 9-blade thermo-fan, \$150. Placentia, 528-5006. A

Corvette, 1960, 230 hp, 3-spd. trans., 1 owner, \$1350. Manhattan Bch., 379-3477. A

Chevrolet SS, 1963, 409 w 400 hp, 4-spd. 19,000 act. miles, \$1300. L. A., 757-5455. A

Sailboat, 16' skimmer class sloop, 2 sets sails, hull glassed, 3 rudders, trailer, many extras, repainted, \$750. Garden Grove, 714-539-2098. A

Chevrolet, 1958, 4-dr., stick shift, \$400. Long Beach, GA 2-4740. A

Battery Charger for car or boat, 6-8-12 volts, \$4. Hawthorne, 676-0418. A

Ford Galaxie 500, spec. 406 new eng. & access., tri-carb, positrac, 4-spd. trans., 2-dr. h/top, \$1800. Inglewood, OR 7-7355. A

Drawing Table, commercial artist-type, cast iron center stand, tilts & raises, \$20. Gardena, DA 3-3202. A

Fiberglass Panels, corrugated green, 6 26"x 8', 6 26"x6", 2 34"x6", 2 34"x8'; train eng., HO elec.; baby bed & springs, \$65. Hawthorne, OS 5-1860. A

Wheel Chair, folding, Everest Jennings, \$75. Torrance, DA 5-5245. A

MG TD, 1952, \$350. Lawndale, 675-7958. A

Sewing Machine, Montgomery Ward, portable, used very little, \$25. Long Bch., GA 3-1363. A

Bicycle, boy's 26" Schwinn, \$13. Torrance, FA 8-3306. A

Volkswagen, 1963, full sunroof, \$1150. Long Beach, 596-1280. A

Chevrolet Nomad Station Wagon, 1958, p/s, p/b, r/h, new trans., big eng., \$425. P. V. Pen., 377-7241. A

Motorcycle, 1961, 250 cc Royal Enfield Scrambler, set up for dirt, good tires, extra gearing, \$250. Long Bch., HA 5-5198. A

Sailboat, Cal 20 #287, w/trailer & motor, many extras, \$4000. Torrance, FR 5-9375, 325-2613. A

Chevrolet, 1958, 2-dr., 348 cu. in. eng., 3-spd. trans., Hearst floor shift, \$400. P. V. Pen., FR 7-5439. A

For Sale

Rambler station wagon, 1960, r/h, air condition, 6-cyl., \$350. Torrance, 835-3985. A

Snow Tires, Town & Country Firestone, 7.75x14, 4-ply rating, \$40. Lawndale, 371-6775. A

Chevelle El Camino, 1964, 4-spd., bucket seats, r/h, p/b, \$1800. Hawthorne, OS 6-3169. A

Furniture, end tables, kitchenette set, rugs different sizes, curtains, \$30. Manhattan Bch., 379-6762. A

T-Bird, 1956, h/top, recent o/haul, paint & tires, auto., orig. owner, \$1275. Pacific Palisades, 454-2057. A

DeSoto, 1959, auto., p/s, p/b, radio, new tires, points & plugs, \$150. Lomita, 325-8566. A

Volkswagen, 1965, radio, seat belts, sunroof, low mileage, \$1650. Long Bch., 633-5938. A

Exec. Home, 4-bdrm., family rm., prof. landscaping compl. w/full water sprinklers, covered 16 x 24 patio, central air cond., block wall fencing, \$32,500. Anaheim, 714-630-2662. A

Renault Dauphine, 1961, new tires, radio, \$350. P. V. Pen., 377-4489. A

House, 2-bdrm., paneled den, lrg. kitchen, newly decorated, 10 min. from Northrop, \$25,000. Inglewood, 751-7367. A

Camera, 4x5, Crown Graphic, power flash meter sp, plates, flash gun, case, \$275. Inglewood, 677-6348. A

Pickup, Chevrolet, 1963, 3/4-ton, r/h, auto., V-8 eng., hvy. duty, equipped for camper, air-cond., many other extras, \$1575. San Pedro, 833-8286. A

T-Bird, 1962, r/h, all power, good tires, \$1550. Inglewood, 677-0743. A

Coat, woman's Naugahyde, w/belt, pink, size 14, cost \$37, \$25. Hawthorne, OS 6-7082. A

Bicycle, girl's, 24", balloon tires, needs cleaning, \$10. Los Alamitos, 430-1245. A

T-Bird, 1957, orig. owner, 47,000 miles, \$1700. San Pedro, TE 2-1684. A

Encyclopedia Americana, 30 vols. plus min/max teaching machine w/varied selection of courses, \$299.50. Lawndale, 370-3230. A

House, 2-bdrm., dining rm., fireplace, dble. garage, \$21,750. Inglewood, OR 1-3860. A

Sailboat, lightning class, #5690, incl. trailer, sprinkler & all access., \$950. Manhattan Bch., 379-6572. A

Corvair, 1961, Lakewood station wagon, auto., r/h, \$695. Venice, EX 1-2040. A

Mustang, 1965, convt., 11,000 miles, white p/top, 289-4V-V-8 eng., Cruise-O-Matic, p/s, disc brakes, w/s/w, r/h, console, \$2690. Costa Mesa, 714-KI 9-2646. A

Ford, 1959, air cond., \$425. L.A., 474-3433. A

Bicycle, boy's, 10-spd. Derailleur, Puch-Burgmeister, new spokes, tubes, gears reworked, \$40. L.A., 645-3019. A

Mangle Ironer, Kenmore, \$35. Harbor City, 325-5705. A

Vacuum Cleaner, Kirby, all attachments, floor polisher & waxer, never used, \$75. Hawthorne, OS 5-2772. A

Trailer Hitch, custom built for 1960 Pontiac station wagon, bolts to frame, hvy. duty, \$7. P. V. Pen., 377-4585. A

Stove, gas, \$15. Inglewood, 672-7227. A

Wanted to Buy

Stove, coppertone, gas, reasonable. Inglewood, 672-6754. B

Trailer, 2-wheel utility-type, 4'x8', good condition. Harbor City, 325-0221. B

Radio Equipment, Motorola, GE or RCA units for use on 2 meters, unconvtd. 150 to 170 mc, mobiles &/or base stations acceptable. Whittier, OX 3-4117. B

Vacuum Cleaner, used, upright, reasonable. P. V. Pen., 377-2101. B

Student Desk, chair, bookcase; any one or all three. Manhattan Bch., 379-1163. B

Radio Receiver capable of receiving 156 m.c. Redondo Bch., 370-7749. B

For Trade

Bicycle, girl's 28", Sears J. C. Higgins, about \$15 value, trade for 20" or 24", girl's. Hawthorne, 676-4251. C

Baby Furniture, all or part; crib, high chair, training chair, jumping chair, trade for 8 mm motion picture camera or projector of equivalent value & condition. Age need not be equivalent. Hermosa Bch., 379-1542. C

FREE (To Be Given Away)

Pups, small German shepherd, all black, females, 6-wks-old. Monterey Pk., PA 8-4606. D

Rentals Offered

House, 3-bdrm., 1 1/2 bath, built-ins, dble. garage, 1 mile from ocean, lease/option, \$140 mo. Redondo Bch., 374-2433. E

Duplex, front, unfurn., 2 lge. bdrms., gar., water & lawn pd., near shopping, 5 min. to Norair, \$100 mo. L.A. PL 4-1964. E

Bachelor Apt., utilities pd., 2 blocks from Norair, \$90 mo. Hawthorne, OS 6-7417. E

Bachelor Apt., furn., utilities pd., nice yard, \$45 mo. Hawthorne, 754-9866. E

House, 4-bdrm., 1 3/4 bath, large kitchen & parlor, forced air heat, children OK, \$150 mo. Lawndale, OS 6-0586. E

Apt., 2-bdrm., modern, pullman bath, built-in cabinets & oven range, thermo heat, gar. & child's play area, 2 children OK, \$100 mo. Torrance, 320-2827. E

Apt., 2-bdrm., unfurn., built-ins, fenced in backyard, 15 min. to Northrop, \$110. Lennox, OR 1-6734. E

Apt., deluxe 2 or 3 bdrm., \$135 mo. Torrance, 325-1056. E

Apt., 2-bdrm., unfurn., gar., across from high school, 10 min. from Norair, \$95 mo. San Pedro, 831-6789. E

Apt., 1 bdrm., furn., encl. gar., 1 block to beach, \$105 mo. Manhattan Bch., 379-7701. E

Apt., 3-bdrm., 1 1/2 bath, built-ins, pvt. gar. & sundeck, near Northrop, children OK, \$150. Hawthorne, OS 5-7938. E

Apt., 2-bdrm., furn., lge. pool, closed gar. & storage, near El Camino, \$135. Torrance, DA 9-5986. E

Apt., 3-bdrm., unfurn., 2 lge. baths, serv. porch, patio, family rm., fireplace, dishwasher, introm. f.a. heat, built-in units, near Norair, \$180 mo. Hawthorne, 679-1358. E

Apt., 1-bdrm., 3 blocks from Northrop, unfurn., except for stove & refrig., colored tile bathroom, parking for 2 cars, \$85. Hawthorne, OS 6-4734. E

Going my way?

Rides Wanted

7 a.m. — 3:45 p.m.

Sepulveda & Hawthorne Blvd., Torrance. Pauline Doyle, Norair, ext. 2605, 325-7553. 2

7:30 a.m. — 4:15 p.m.

Fallbrook Ave. & Ventura Blvd., Canoga Park. Veronica Stockard, Norair, exts. 1480, 1914, 347-4200. 3

Crenshaw or Van Ness & Artesia, Torrance. Elaine Gagnon, Mariposa, ext. 4265, 323-0826. 3

Hermosa Ave. & 25th St., Hermosa Bch. Penny Prouty, Norair, ext. 1458, OS 9-6520.

Coldwater & Chandler Blvd., No. Hollywood. E. R. Knott, Norair, ext. 2324, 761-9645. 3

8 a.m. — 4:45 p.m.

Yale St. & Broadway, Santa Monica. Arnold Weinstock, Norair, ext. 1758, EX 3-9047. 5

Orange Ave. & Del Amo, Long Beach. W. H. Covert, Norair, ext. 2721, GA 3-1363. 5

Rides Offered

7:30 a.m. — 4:15 p.m.

Fallbrook Ave. & Ventura Blvd., Canoga Park. Veronica Stockard, Norair, exts. 1480, 1814, 347-4200. 13

Coldwater & Chandler Blvd., No. Hollywood. E. R. Knott, Norair, ext. 2324, 761-9645. 13

8 a.m. — 4:45 p.m.

Yale St. & Broadway, Santa Monica. Arnold Weinstock, Norair, ext. 1758, EX 3-9047. 15

Orange Ave. & Del Amo, Long Beach. W. H. Covert, Norair, ext. 2721, GA 3-1363. 15

Rentals Offered

Apt., deluxe, lge. 2-bdrm., unfurn., 1/2 blk. from ocean, beam ceilings, built-ins, gar., avail. after Feb. 23rd., \$150 mo. Manhattan Bch., FR 9-9996. E

Rentals Wanted

House, 2-bdrm., unfurn., in Hawthorne area, approx. \$90 mo. Compton, 639-1875. F

Personals

Secretary wishing to share apt., 2-bdrm., built-ins, patio, close to Northrop. Inglewood, OR 1-5242. L

Flying Bonanza to Ohio & Eoston, March 25-April 12, would like 1-way or roundtrip passengers to help w/expenses. Hawthorne, 679-7563. L

Flying Club has opening for student pilot. L.A., 293-0213. L

For Sale or Trade

Truck & Camper, 1965, Datsun, step bumper, radio, 8000 miles, \$1450 or trade for late model camping trailer. South Gate, 714-529-1790. M

VW Camper, 1962, 28,000 miles, Westphalia model, top rack, 2 fitted tents, \$1850 or trade for VW sedan. Gardena, 329-2904. M

Camper, 8 1/2' 1/2 cabover, cost \$1375, \$900 or trade for travel trailer of like value. Gardena, DA 4-1593. M

Plymouth Belvedere, 1957, r/h, good tires, \$100 or trade for used Honda 50. Inglewood, 679-4237. M

Camper, Pilgrim, 1965 model, fits any 8' fleet side pickup truck, \$695, or trade on 18' to 20' self-contained trailer. Gardena, DA 4-7623. M

Sailboat, 15' Sunray, w/trailer, \$200 or trade for motorcycle or guns. Torrance, DA 3-2144. M

FRINGE BENEFITS

(Continued from page 2)

tion it can on the situation. It then reaches a decision and notifies all concerned.

It sounds as if we are getting a little repetitious but let's assume that the employee is still not satisfied with the decision made. He can then go to arbitration, which means in substance that the employee and the company select an outsider from a list of recognized arbitrators furnished by the Government who then hears the case.

All of this sounds pretty complicated but it really is not. Each step must fall within a prescribed time limit so that things move along rapidly. Industrial Relations people are always ready to help the employee in any stage of the proceeding in preparing his documents, lining up his witnesses, et cetera. The employee may have a fellow employee or a lawyer represent him if he so desires. In short, everything is done to ensure that every individual employee's rights are fully protected and upheld.

In conclusion, let me tell you of a recent experience. An ex-employee was talking with me a few weeks ago. He said that he was sorry that he was no longer working at Northrop but that he felt that he had been laid off improperly several years back and was still disturbed about it. When I asked him why he didn't file a grievance, he said that he had been too upset. He did not say so, but perhaps he felt as some people do, that probably the company would back up its

supervisor anyway and that even if he won the supervisor would hold a grudge against him forever.

This gentleman was obviously a fine man who would have continued to be a credit to the company. Certainly he didn't have to file a grievance, but the company would like to have people in this kind of a situation do so.

He needn't have had the slightest fear about getting a fair hearing because company management knows that its supervisors can make mistakes and that when mistakes are made they should be corrected. He need have had no concern about his supervisor holding a grudge because the right kind of supervisor is anxious to do the right thing and recognizes his mistakes when they are pointed out to him. Even if the gentleman had been found to be wrong about the layoff, he would have had his hearing and would have avoided years of unrest.

If there is a moral to be read from this story, it is that the company can't know about the individual's problems unless the individual makes them known. The Northrop grievance procedure is there for the employee to use. We hope that he will read it carefully and that he will use it. He will thus be assured of the person-to-person relationship with his management which is so necessary in ensuring that each of us is recognized and treated as an individual.

KEN MAH BECOMES WISE OWLS' FIRST VENTURA INDUCTEE

Kenneth Mah has become the first Wise Owl at Northrop Ventura since the inception of the eye protection program in 1964.

Mr. Mah is enrolled as a life member of the Wise Owl Club at Northrop Ventura. This is a national organization which is sponsored by the National Society for the Prevention of Blindness, Inc.

The certificate of membership was presented on December 15 by Earl Clark, chairman of the Supervisors' Safety Committee. The certificate reads:

"Kenneth Mah is enrolled as a life member of the Wise Owl Club of Northrop Ventura and is acclaimed for his judgment and foresight in the conscientious use of the eye protection which has saved his vision in a work accident."

Ken came to work one morning in the Plastics shop expecting a routine day. The fact that he put his safety glasses on and wore them all day proved to be one of the most important things he ever did in his life.

Later, using a drill motor, a chuck key which was not disengaged was ejected like a projectile toward his left eye. A split second later he felt the impact as the left lens of his safety glasses shattered. There was no injury but it could have been a disastrous event.

"Habit had dictated that he put on his safety glasses before starting the job each day. When he needed them most, he had them where they should be—not in his pocket or his tool box, but over his eyes," Mr. Clark said.

"Good safety habits are solid insurance in cases such as this when the unexpected occurs. Wearing eye protection all the time in the plant will prepare for the unplanned event that could rob a man of his precious sight."

30 Explorers Learn About Stock Market

Explorers in Ventura County's first special interest post, sponsored by Northrop Ventura, learned something of the ins and outs of the business world during their last two meetings.

With Walter F. Sternadel, treasurer, and Les Hudson, director of Contract Accounting, 30 of the Explorers visited a stock exchange and a major brokerage firm on Los Angeles' Spring Street.

Their next meeting brought them inside the Ventura Division where Tom Flannigan, manager of Marketing, and Jim Brochu, director of Production Programs, introduced them to some inside aspects of business.

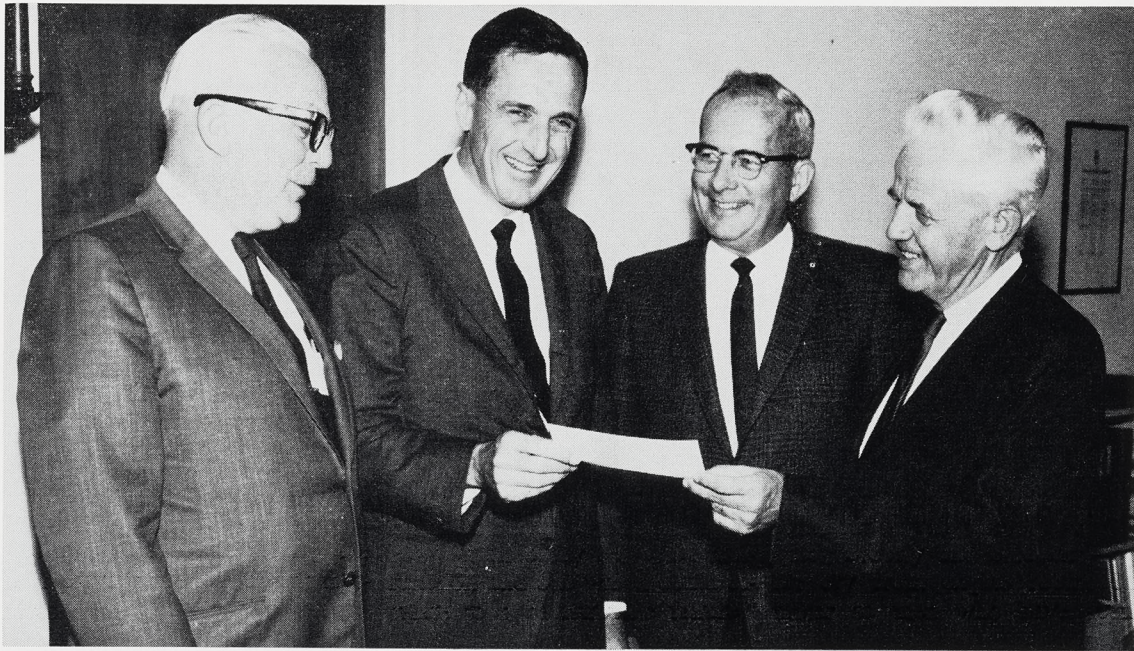
Because of a major outbreak of flu at Thousand Oaks High school, affecting some 650 students, about half of the post membership attended the second event.

During the visit to Newbury Park, the post heard Mr. Flannigan describe the functions of marketing and planning. Mr. Brochu described the complexities of aeronautical systems.

Motion pictures helped the high school students understand the background and present work of Ventura, how and why drones are utilized, and some new concepts in aerodynamics.

Bart Cook is coordinator of the Explorer post and Don Archer, advisor on behalf of Northrop Ventura.

\$1000 GIFT TO HIGHER EDUCATION



Another annual gift to California Lutheran College in Thousand Oaks, check for \$1000, is presented to Dr. Raymond M. Olson (right) by George C. Grogan, vice president and manager, Technical department of Northrop Ventura. Participants in ceremony were John Nordberg, left, director of church, public and alumni relations; and Chester Shamel, director of college development. Amount was designated by Northrop Corporation University Relations Advisory Board.

Participants in ceremony were John Nordberg, left, director of church, public and alumni relations; and Chester Shamel, director of college development. Amount was designated by Northrop Corporation University Relations Advisory Board.

PENNS ON THE MOVE

The Family That Retires Together...

Northrop Corporation's first couple to retire simultaneously, Gilbert and Edith Penn, have entered the "good life" after being feted to a rousing farewell party by their Northrop Norair friends.

This pre-Christmas affair drew some 100 well-wishers to the Northrop Norair cafeteria December 22. In addition to personal "bon voyage" wishes, those taking part presented the Penns with evidence of their affection in the form of about \$100 to help them enjoy their new leisure. Adding to the festivities was a huge cake appropriately bedecked with boat, trailer, fishing scenes

and the like, in keeping with the plans the couple have in mind.

Edith Penn worked for Northrop from 1943 to 1951, then left for a brief period, returning the same year. Since 1951 she has served as an Automated Operations Control operator in Production Control department.

Gil Penn also joined Norair in 1951 and worked as a fork lift operator in Maintenance before shifting five years ago to Transportation. He has operated every type of in-plant vehicle since then and more recently served as a dispatcher.

The Penns acquired a mobile

home and plan to reside in the Hemet area "between trips." That is, they also own a pickup truck and camper unit in which they hope to fulfill a lifetime dream of "just going."

"Next spring we'll go into the northeastern part of the country, then on up into Canada," Mr. Penn said. "After that, who knows?"

(Editor's note: Northrop Nortronics also has at least one retired couple, Clarence and Tillie Hawken. However, Mr. Hawken entered retirement in 1956, while Mrs. Hawken worked until 1964 before retiring.)

CONACO FOCUSES ON FLARE KIT IN SECOND HALF

CONACO, the Northrop Ventura-sponsored Junior Achievement company, swung into action the second half of their fiscal year with an emergency flare kit as their product.

The group produced Christmas wreaths in addition to the kits during the first half of the 1965-66 season.

CONACO was represented recently at the 11th annual JA Sales Convention at Los Angeles Trade Technical College. In attendance were Lynn Aldrich, vice president, Sales; Gail Wolf, promotion manager; Mike Finch, Personnel director, and Cheryl Polen.

Douglas Finch, sales advisor, and Walter Knox, management advisor, attended on behalf of Northrop Ventura.

Other CONACO officers include Tom Wild, president; Ronaale Craig, secretary; Jamie Sturm, treasurer, and Dennis Zachery, vice president, Manufacturing.

County Junior Miss Scores in Pageant

Janet Lynn Carroll, Ventura County Junior Miss, met with threefold success in the California Junior Miss Pageant.

The daughter of Laurence B. Carroll Jr., director of Production and Production Engineering at Northrop Ventura, was selected a finalist among 10, took the scholarship title competing with 19 other top feminine students, and won the Junior Miss-Breck award for her essay on what beauty means to her.

Janet was sponsored in the state pageant by the Ventura Junior Chamber of Commerce, which staged the county-wide Junior Miss contest in January.

Automation Has New Voice On Luxury Ship Sagafjord

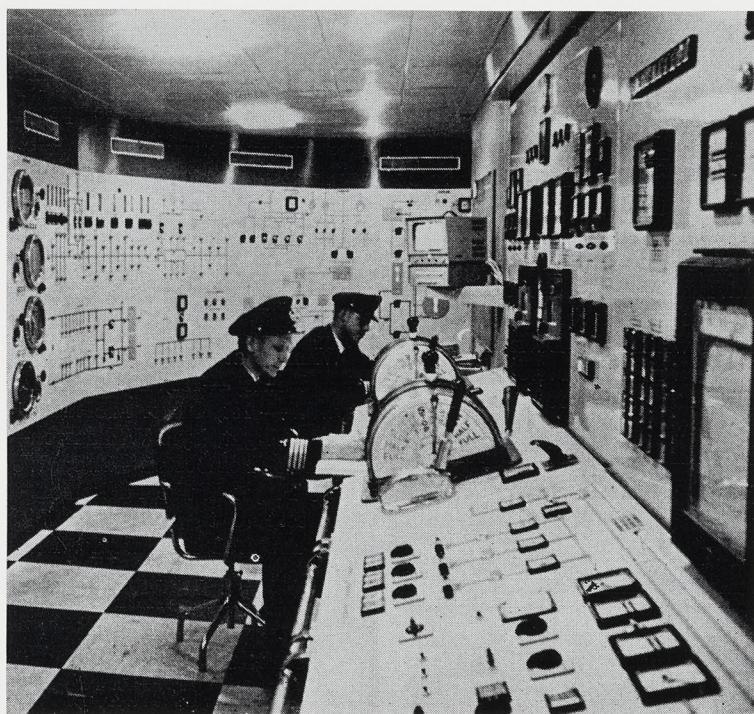
Norwegian America Line's new 21,500-ton cruise liner Sagafjord, the first ocean vessel to use an automatic voice warning system to alert crewmen of malfunctions or out-of-tolerance conditions, has completed her maiden voyage from Oslo to New York.

Developed and manufactured by Northrop Nortronics, the voice warning system (VWS) has been integrated into one of the most extensively automated passenger ships afloat.

Aboard the Sagafjord, VWS keeps tabs on 50 critical parameters of ship performance and automatically issues recorded verbal messages, on a priority basis, to identify problems which may arise.

The system eliminates the possibility that a warning light, buzzer or faulty gauge reading will go undetected by a crewman working in the ship's active control center. When an out-of-tolerance condition occurs, the Northrop VWS plays its message in a crisp, easily comprehensible voice until the problem is corrected.

If multiple malfunctions occur simultaneously, the system programs the more urgent warning first. It will interrupt any message should a malfunction of higher priority occur, while storing for later payout the less urgent messages.



Clean, quiet and efficient is automated control room of luxury ship Sagafjord, which includes Nortronics Voice Warning System.

Tests have indicated that the time involved in recognizing, comprehending and reacting to a malfunction is reduced by half when a Northrop VWS is used instead of conventional warnings.

"Such a decrease in the time required to react properly to a problem can mean the difference between an easily corrected malfunction and one which could escalate to a catastrophic failure,"

according to Al Vogel, chief of the Weapons Status Reporting Equipment group at Palos Verdes.

And, according to the Norwegian America Line, "automation has eliminated the need for old fashioned klaxon alarms and has curtailed necessity for shouted commands. The nerve center is quiet, orderly and efficient — a far cry from engine rooms familiar to men who have spent

their lives at sea."

In the 79-foot control room of the Sagafjord, the chief engineer sits at a desk facing a master panel fitted with nearly 200 instruments.

There's a galaxy of colored lights, dials, switches and buttons that guard performance of major equipment and also provide a means to apply corrective measures.

With so many instruments and lights on a control panel, there is a danger of "visual loading", a condition that can slow the engineer's reaction to an emergency.

With the voice warning system, he knows immediately what is wrong and where, rather than having to continuously survey the complete control panel to isolate a malfunction.

Typical of VWS recorded messages which the Sagafjord chief engineer might hear are:

"High temperature at bearings of main engine, port side."

"Lube oil low pressure, main engine, starboard side."

"Cylinder water pressure low, main engine, port side."

The system was originally developed by Nortronics for use on U.S. Air Force B-58 bombers. A similar system is used to monitor operational readiness of Minuteman intercontinental ballistic missiles.

AWARDS

(Continued from page 1)

at the division's Van Nuys location in the development laboratory, followed by a year at Holloman Air Development Center on field test of the XQ4B drone.

He served previously in missile field test both at Holloman and the Air Force Missile Test Center in Florida.

Mr. Emerich, who had been with Nortronics, came to Ventura in October 1964. He is general foreman, Experimental Electronic Fabrication.

He has participated in the Apollo, Gemini and ASCAC programs. On Apollo and Gemini he was connected with electrical and electronic installation, and paradyamics.

Northrop Ventura 15-year pin recipients are John Via, Mary McDaniels, Barbara Dukes and Stanley Jackson.

Ten-year pin recipients are Rex Ridout, John Findley, Henry Lee, Marvin Schuler, Harold Wright, Anthony Viano, Paul Stewart, Margaret Ruggiero, Patrick Cunningham, Walter Gilbert, William Bridwell, Elizabeth Bitney, Jim Middleton, Janice Karmire, Bonnie Stewart, Lester Goodwin, Valeria Meredith and Robert Klein.

West Valley Standings Overhauled by Rogues

Northrop Ventura Bowling Club's West Valley division standings underwent a shakeup in the 16th week, Zack Silvers, commissioner, reports, with the Rogues relieving the Four Scores of first place.

Paced by Hank Fonvergne's 569 the Rogues moved up out of second despite Wes Steyer's 566 for the Four Scores.

Commissioner Silvers' team was bowled over by the Pin Pluckers. Led by Tony Piscuskas' 627 and Ray Bourland with a 616, the Pluckers moved into second place, a game behind the Rogues.

The Dukes of Oil went from fifth place into a three-way tie for third with the Four Scores and Splitters, powered by Les Meyers with 645 and Larry McCauley with 565.

Mr. Silvers says the Spark A Marks, holders of the Team High Series record, are still entrenched in last place, fighting off all efforts to displace them.

Here are the season high totals:

Individual series, Ray Bourland, 667; Joyce Nelson, 688.

Individual game, Wes Steyer, 263; Patricia Wilkoff, 257.

Team high game, Rogues, 822. Team high series, Spark A Marks, 2337.



Northrop Ventura General Manager George Douglas presents 25 year service pins to Robert E. Spies (left photo) and Richard M. Warner (right photo). Mr. Spies is assigned



to Flight Operations section and Mr. Warner is director of Aero Instrument Department. Twenty-three other Venturans were awarded service pins recently.

PANEL: Products, Prospects Discussed

(Continued from page 1)

never before thought of in order to meet price competition. For the most part, we will upgrade our personnel from within our organization."

Technical requirements will emphasize "engineers with ingenuity," Vice President-Technical George Grogan said. Mr. Grogan's picture of the ideal engineer involved a flexible individual with the ability to move from aerodynamics to paradyamics to hydrodynamics.

He emphasized the need for analytical, creative, aggressive, and confident people. He also urged his staff to be critical, in a constructive manner, of technical and management methods, and of themselves.

W. F. Sternadel, treasurer and Finance manager, stated a need for personnel skilled in data processing methods to implement and maintain data planning and control for integrated information systems.

Of special note, he said, are plans to revamp the Division's financial data storage system, moving up from an IBM 1401 to an IBM 360-30 tape system.

In response to a question of promotion policy, Vice President-Administration H. E. Riggins explained that a review of the past 13 months promotion records revealed that 66 percent of the advancements in the salaried supervisory category were made from within the Division. In the salaried non-supervisory category, the ratio was about 50-50, but "this was due to the need for specialized technical personnel which we did not have within the Division," he said.

"It is the stated Corporate policy that, wherever possible,

promotions will be made from within the company, and this is a policy to which we adhere," Mr. Riggins added.

Other key points which were brought out in the discussion included:

—Northrop Ventura's steerable parachute is "about two years ahead of the game," mainly due to advancements in modulation of lift/drag (L/D) ratio.

—Mr. Grogan said he was proud of the analytical work done to date on the ASCAC (Anti-Submarine Classification Analysis Center) program and that the customer (Naval Air Development Center) was complimentary of the Division's approach to the problem.

—Recent changes in national policy may require additional or-

ganizational changes until a "hard core team is developed."

—The move to Newbury Park into a more efficient production facility, combined with implementation of new techniques, has enabled Production Operations to reduce its costs substantially and, hence, its competitive position for subcontract work. Major production activity in the next few years, however, will be on drones and other products designed by the Division, Vice President-Production M. A. Maurer said.

—Aero Instruments department of North Hollywood, which comes under the supervision of Production Operations, has experienced as great a greater dollar volume in the first six months of fiscal 1966 as it did the entire fiscal 1965. Ed Illes, Marketing manager for Aero Instruments and moderator of the evening's panel, described a much improved market picture for the department's main products—pressure switches, transducers, frequency and time meters.

Management Club President Bill Young said, "This was a good start in carrying out our theme for the year 'management communication.' The panelists did a tremendous job in answering the questions."

"The questions were broad enough to be of interest to everyone, and the answers were sincere and meaningful," a member of the audience commented after the meeting.

Mr. Young presented a plaque to Bill Green, last year's Club president, for "his outstanding contribution to the group."

NEW SERVICE

(Continued from page 1)

ment for promotional opportunities. He provides detailed information on the savings plans, retirement plans, group insurance and the aid-to-education program.

Mr. Fairless pointed out the importance of advanced planning for retirement.

"Mr. Via," he said, "will talk to people about this early, pre-dating their retirement by not less than 10 years."

"He will offer information on supplemental financial programs and on the opportunities and challenges available to them in retirement."

Mr. Via is president of the Recreation Club, the Dollar Donors and the Credit Union.

Boy Scout Troop 35 Holds Court of Honor

Some 35 boys of Boy Scout Troop 35, sponsored by the Northrop Ventura Management Club, met recently for a Court of Honor in which several received scouting achievement awards.

Institutional representative from the Ventura division is Douglas Finch.

Mr. Finch's son Mike was awarded the red belt for more than 40 days accumulated camping time. A second scout, Jim Scaminaci, received a red belt.

Both Mike and Jim are transferring to Explorer Post 603.

Vigicon Will Screen Fleet Exercises

Exercises at the Navy's Atlantic Fleet Weapons Range will soon be recorded by a real-time, multicolor information display system now being built by Northrop Nortronics.

Northrop will furnish the high density display system for the range control center at Roosevelt Roads, Puerto Rico. The system, which will be operational this year, will aid in the evaluation of weapons systems used by the fleet.

Movement of up to 25 ships, 80 aircraft, and all weapons and troop landing operations can be projected by the three independent display subsystems. Command center personnel will view action during exercises on three 7-by-7 screens.

Nortronics Vigicon subsystems will receive information from both computers and manual sources, and is capable of displaying color-coded data in symbology.

The two side subsystems each consist of five Nortronics Vigicon projectors, and the center projection subsystem contains seven Vigicon projectors.

Side screening groups are served by three plotting projectors, one spotting projector and a reference projector. The Vigicon plotters are used to place data onto the screens as it is presented into the projectors, without requiring a preprocessing technique. Spotters are similar to plotters, but do not leave a permanent record of data fed into that type of device. Reference projectors are used to superimpose background maps onto the viewing screens.

The center subsystem is similar, except it also has the capability to display "time selectable" track history. The two additional plotters in the center device can be preset to alternate the projection of gathered information. While one projector is displaying data, the other plotter continues to receive inputs for future viewing.

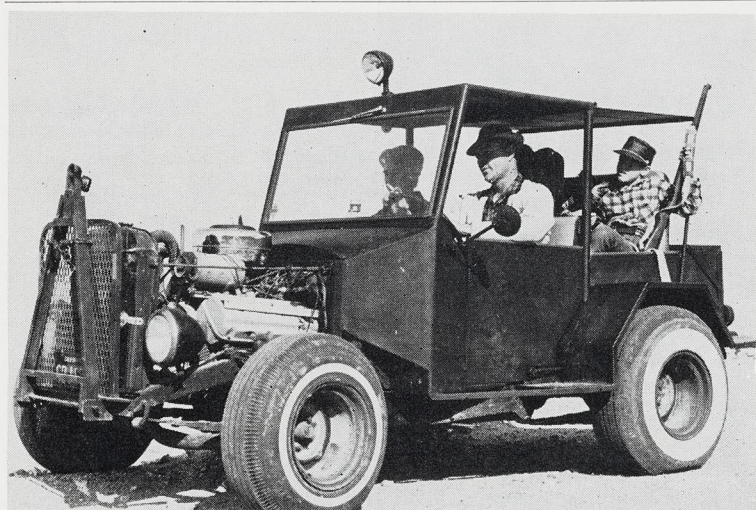
ULTRA PRECISION TEST LABORATORY TO BE DEVELOPED

A feasibility study for an inertial guidance laboratory that will develop and test systems for next generation's space probes is being conducted by Northrop Nortronics Precision Products Department (PPD).

The laboratory will be at NASA's Electronics Research Center, Cambridge, Massachusetts.

PPD will make a complete feasibility study, including recommendations on the laboratory's design, geological surveys of the area, types of test equipment needed and estimated cost of the facility.

PPD has already designed and built two inertial guidance test facilities—one for the Navy's Applied Science Laboratory and a second laboratory at Nortronics' Norwood plant. The labs, called Ultra-Precision Test Equipment (UPTe) facilities, are recognized as two of the most modern in operation.



FUN VEHICLE—Sand buggy owned by Jim Middleton takes him and his family over desert terrain where even horses give up (story on page 1).

NORTHROP NEWS

NORTHROP VENTURA

Published biweekly by Northrop Corporation, Beverly Hills, California

Vol. 24, No. 4

March 2, 1966

GEMINI SYSTEM PERFORMS BEYOND DESIGN CONDITIONS

While NASA is preparing for the launch of Gemini 8 on March 15, parachute landing systems have been delivered by Northrop Ventura for the remainder of the program, through GT-12.

A meeting was scheduled this week by NASA at Houston to review the detailed analysis of the GT-6 parachute, the first to be recovered after returning Gemini astronauts from orbit, according to Bob Provart, Gemini project engineer and chief of Paradyamics Systems and Projects group at Ventura Division.

"According to our own preliminary analysis, the only damage suffered by the chute was from normal wear and tear of the recovery operation," Mr. Provart said.

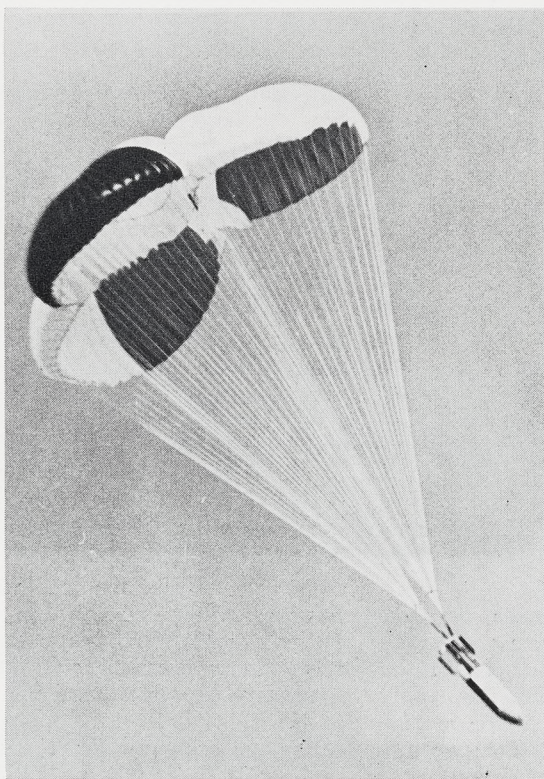
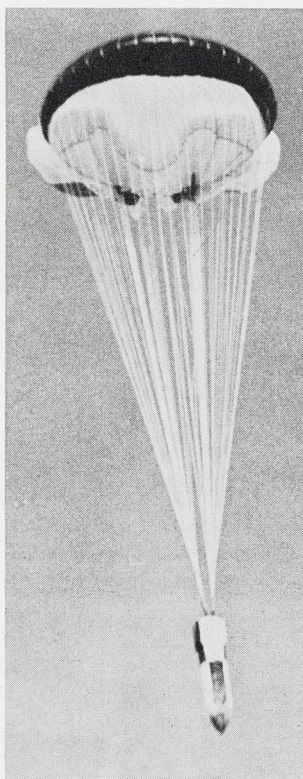
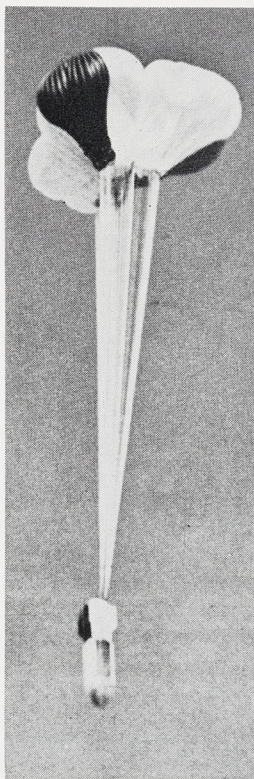
In looking back over the perfect performance of landing systems in the Gemini program to date, Mr. Provart pointed out that the systems had actually performed beyond design conditions on occasion.

During the GT-5 landing sequence, the drogue chutes were fired at 70,000 feet instead of the 50,000 feet for which they were designed.

The drogue, a nylon conical ribbon chute measuring 8.3 feet in diameter, held fast at a speed of Mach 1.4, even though it was designed to function at a speed of Mach .9.

The drogue parachute—a major improvement upon the Mercury landing system—was added to stabilize the Gemini spacecraft after it decelerates from orbital and re-entry speeds and to provide additional deceleration before deployment of the pilot and main parachutes.

Neil A. Armstrong, the first civilian astronaut, and David R. Scott will attempt to linkup with an Agena satellite 185 miles above the earth during the three-day mission this month. Mr. Scott is expected to leave the spacecraft during at least one complete orbit.



ONE, TWO, THREE—Northrop Ventura Cloverleaf parachute, dropped from B-66 aircraft last month, deploys first in reefed condition to prevent opening shock (left photo). Front lobe of three disreefs and fully opens in second

photo. At right, Cloverleaf is fully open and "flying" to the left. Dark colored sections in two trailing canopies are flaps which may be raised or lowered to modulate the glide ratio.

EARNINGS JUMP 30 PERCENT OVER 1965 PERIOD

Northrop Corporation's consolidated net earnings for the second quarter of the current fiscal year amounted to \$2,773,000, or 66 cents per share, an increase of 30 percent over the earnings of \$2,013,000, or 49 cents per share, in the second quarter of last year, Thomas V. Jones, president and chairman, has announced.

Sales and other income for the three months period, which ended January 23, 1966, totaled \$85,189,000 as compared with \$87,505,000 in the same period last year.

Earnings for the first half of the fiscal year amounted to \$4,464,000, equivalent to \$1.07 per share on the 4,170,910 shares outstanding, according to Mr. Jones. This was approximately 10 percent higher than the \$4,020,000 earned in the same period a year ago which was equivalent to 98 cents per share on the 4,096,309 shares then outstanding.

Sales and other income for the six months just ended amounted to \$155,752,000 as compared to \$155,752,000 as compared (See EARNINGS, page 6)

Eleven F-5's on 6200-Mile Flight To Join Royal Norwegian Air Force

Eleven Northrop F-5 supersonic jet fighters left Edwards AFB, California, last week on a 6200-mile flight to Norway to join the Royal Norwegian Air Force as first-line tactical fighters.

The squadron of twin-engine 1000-mile-per-hour airplanes comprise the initial delivery of a total of 64 F-5's being built by Northrop for the RNoAF.

In October a squadron of U.S. Air Force pilots flew 12 F-5's 8000 miles to South Vietnam for combat duty there, and in December four F-5's of a number being built for Iran flew 11,000 miles to that country, following the same fog-bound North Atlantic route planned for the flight to Norway.

The F-5 fighters which left Edwards AFB were destined for Rygge Air Station near Oslo. Three of the aircraft were piloted by Norwegian officers, while the others were flown by U.S. Air Force Tactical Air Command pilots.

It was the second time in 26 years that Northrop has supplied

combat-type aircraft for Norway. In 1940, the company designed and began building 24 armed seaplanes for that Northern European nation. It was the first overseas country with which Northrop signed a military contract.

The seaplanes, designated N-3PB, served with distinction in World War II. They established a modern-day Norse legend by helping to sink the German battleship Bismarck, destroying enemy planes and surface vessels, and single-handedly capturing an enemy submarine.

The N-3PB had six machine guns and carried 2000 pounds of bombs, while today's F-5 fighter has two 20-millimeter nose cannon and carries 6200 pounds of air-to-air and air-to-ground weapons, including bombs, rockets, missiles and napalm.

The three-day intercontinental flight to Norway will establish several historical milestones.

It is one of the largest airborne deliveries of aircraft to an overseas ally of the United States since the middle of World War (See NORWAY, page 6)

Aerial Test Of Cloverleaf 'Looks Good'

Less than four months after award of a NASA contract, the first aerial drop test of Northrop Ventura's controllable, gliding parachute has been successfully completed at El Centro.

At a press conference at the Manned Spacecraft Center, Houston, following the test, NASA officials told newsmen "the Cloverleaf that you saw looks very, very good."

The 56-foot Cloverleaf configuration, when fully perfected, will offer a gliding range of up to two feet for each foot of vertical descent and capability by which a descending space vehicle could be steered to a pre-determined landing site.

Under terms of the present contract, the Cloverleaf will demonstrate its effectiveness in landing a 5000-pound test vehicle, according to Carl Graham, program manager.

Mr. Graham also was manager of the two previous developmental projects involving the Northrop steerable concept—one for NASA and one for the Air Force Dynamic Laboratory at Wright-Patterson Air Force Base, Ohio.

"The configuration used in the recent drop test is improved in many respects," Mr. Graham said, "including better design and lighter weight."

An earlier 40-foot configuration weighed 200 pounds, compared to the 150 pounds for the 56-foot configuration, he added.

While the program draws on the capabilities of many functional groups within the Division, Mr. Graham cited Vince Riley, Gene Linhart, Dave Coe, and Theo Knacke as being the nucleus of the technical effort.

Mr. Riley and Mr. Linhart are co-inventors of the Cloverleaf (See CLOVERLEAF, page 6)



Mr. Graham

ANNE HOWELL CONDUCTS ASSEMBLY CLASSES

An Instructor by Trade, She's a Grandmother by Nature

To watch Mrs. Anne Howell conducting her refresher courses in electronic module welding and soldering you wouldn't know she is a grandmother seven times over.

Mrs. Howell, who works in Nortronics' Manufacturing Engineering at Hawthorne, is the only woman in the group with a technically oriented job.

She is certified by NASA to initially train and annually retrain each electronic assembly welder and solderer.

The work sometimes takes her from Nortronics to Northrop Ventura where the Apollo para-

chute system requires NASA certified welding and soldering. She is available, as well, to other Northrop installations.

But these are not Mrs. Howell's only tasks.

Within Manufacturing Engineering, she provides an interface between the electronic engineers who design the equipment and the people who must produce each assembly efficiently and according to the design.

Mrs. Howell consults with the design and manufacturing engineers on their requirements.

She inspects each prototype unit to make sure it is in its

most producible form. The manufacturing engineer and she develop the tooling and she builds the first four or five units herself.

In this way she can check for the most efficient sequence and methods of work.

The next step is to train an assembly solderer, and the two of them provide instruction for the remainder of the people who assemble the electronic components.

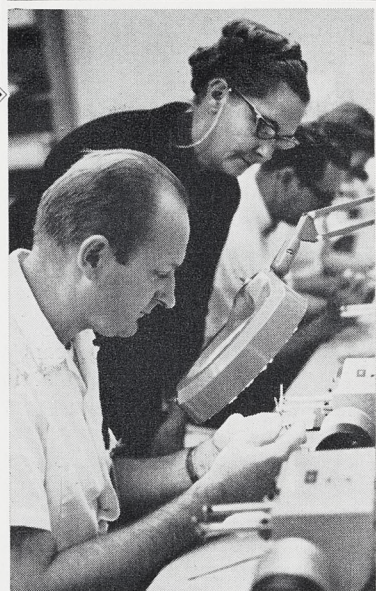
Even if Mrs. Howell didn't admit it, her 14 years with Northrop testify that she enjoys her work.

"I particularly like the training duties," she said. "I haven't met anyone in training I haven't liked."

"It's satisfying to help people with their work problems and give them little bits of information and the refinements you pick up after years in the same type of work."

Mrs. Howell's two sons both have worked for Northrop, Lee at Nortronics, including Voice Warning System, and Fred at Norair in the plaster pattern shop.

She herself has been with Northrop since 1951. She came with Nortronics when the Division opened its doors and worked for the Ventura Division at one time for less than a year.



Mrs. Anne Howell of Nortronics Hawthorne offers tip to Northrop Ventura's Louis Castagna during NASA refresher course in assembly techniques at Newbury Park.

FRINGE BENEFITS

Recreation Clubs: Thirty Ways To Shake That Isolated Feeling



By WILLIAM LARRABEE
Vice President—Industrial Relations

It is not unusual in any large company that a person working at a bench or a desk all day may have no opportunity to meet other people and may get to feeling more like a number than an individual. Any progressive company like Northrop recognizes that people feel more at home, enjoy their work more, and do better work if they know others around them. It is also very clear that the best way to get acquainted is to spend time with those who have similar hobbies and interests.

The Northrop recreation clubs are just what the doctor ordered for getting together off hours and for getting rid of that isolated feeling. Northrop people are active in just about every type of extracurricular activity. Large numbers of them get together throughout the year in club activities which they run themselves and in which they have common interests.

All of this takes money, of course, and the question is often asked as to how these activities are financed. Nearly all of the funds come from the vending machines in our plants. The commissions from those machines go to the recreation clubs, and are spent by the clubs themselves, not the company, to support club activities.

Money is paid to the clubs based on contracts which are set up with vending machine companies selected by competitive bidding. This competitive bidding gets a bit complicated but,

basically, the qualified company which offers to pay the largest commission per cup of coffee, candy bar, package of cigarettes, et cetera, sold, gets the right to install its machines. Thus, every time we buy something in a vending machine, we know that a part of our purchase price is coming back to us in the form of our recreational activities.

I wish that we could talk about all of the things which are done by our various groups. Over 30 different activities are carried on and, certainly, most of us should be able to find something worthwhile in one of these groups. Among other things, there are all kinds of sports. Perhaps the most popular of these is skiing. We have skiing enthusiasts here at the Corporate offices who can be recognized by their crutches and their pulled ligaments.

We do have a real champion at Northrop, however. Elvira Kuehnegger of NSL, whose father is one of our fine Northrop scientists, was raised in Switzerland and has been in about every type of contest that one can imagine both in Europe and in this country. She has taught skiing and I am sure that she would be delighted to hear from any skiing enthusiast. She heads up the Norair/Nortronics Ski Club and has sponsored five trips this winter to the ski country, a fashion show, a Christmas party, and

(See FRINGE BENEFITS, page 4)

DEADLINE NEARS FOR ENROLLING IN MEDICARE PLAN

By BILL WALDON
Corporate Group Insurance Administrator

Medicare health benefits are your right, not charity. You become eligible merely by reaching age 65. It doesn't matter whether you are working or retired, or drawing social security benefits, or what your income is, or what assets you own. So almost everyone is eligible for basic plan benefits, and eligible to enroll for the voluntary plan.

Were you 65 prior to January 1, 1966? Have you enrolled? If not, check with your social security office now. The enrollment deadline under the Medicare Law is March 31, 1966, just about a month away. Failure to sign up can cause you to forfeit the chance to enroll until October 1967 and the chance to receive any benefits until July 1968. Also a 10% higher premium will be assessed for each year in which you fail to enroll.

If you are currently working, you must also enroll for the hospital benefit. This benefit is automatic only for individuals who are receiving social security benefits.

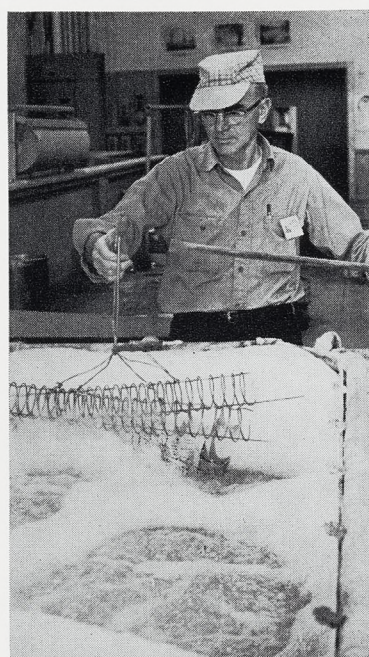
When you sign up you will get an unprecedented bargain insurance rate. A private insurance rate. (See MEDICARE, page 5)

Speed Record Set For Engine Change

From Vietnam comes word, via the "Bien Hoa Bugle," of a new F-5 engine change record set by maintenance personnel of the 4503d Tactical Fighter Squadron.

The time was one hour and 55 minutes and included an engine change and test hop. The change was carried out in an open revetment under adverse field conditions.

Two weeks prior to the new record a similar operation was carried out in two hours, 20 minutes.



Like a witch's brew, alkali agitation-created foam rises in Nortronics Anaheim anodizing area cleaning tanks. William Scott handles part of load of components dropped into tank as another step in cleaning prior to processing. Most parts hit this tank first before moving on to other processing operations.

Channel 28 to Air Technology Series

An hour-long weekly television program which will examine current developments in aerospace technology has been announced by Station KCET (Channel 28), and three of the first four programs should be of particular interest to Northrop employees.

Kicking off the series on March 8 will be a documentary on the Gemini program, with emphasis on GT-7 and 6 and the upcoming GT-8.

On March 15, the program will be devoted to lifting body flight test research. A great deal of the film footage on lifting bodies will be furnished by Northrop Norair which built the M2-F2 and HL-10 research vehicles for NASA.

KCET, Los Angeles' educational television station, also announced that the March 29 program would be devoted to Project Apollo.



Elvira Kuehnegger (left), Barbara Dukes (above), and Orville Mitchell (right), have discovered that NRC offers activities closely related to their personal interest.



FROM BILLY SUNDAY TO THE KENNEDYS

Branzetti Views History Through a Camera Lens

It would be hard to visualize Joe Branzetti in any profession other than photography.

He is a born perfectionist, a stickler for details. His pleasing "cameraside" manner brings out the best in his subjects. His technique bespeaks years of experience.

"Joe the photographer," as Mr. Branzetti is most often called, has been a familiar figure at Northrop Norair for 15 years and many hundreds of people have been caught in his active lens.

Mr. Branzetti tackles each assignment with concentration, leaving idle chatter to others. But when he can be induced to talk, he is an interesting individual. He speaks of almost 60 years as a professional photographer, of a time when he was a favorite lensman for what may well pass as American aristocrats, of building his own business, retirement, boredom and a second career with Northrop.

Born in 1891 at Gaeta, Italy, Mr. Branzetti grew up in a studio operated by his father and a brother. From his early years he was a sort of handy man, errand-boy who was allowed to use the studio equipment only when everyone else retired for an afternoon nap, a local custom.

In 1908 Mr. Branzetti escorted his sister to the United States to keep a wedding date. He liked the experience so well he crossed five times in a four-year period and only settled down to live in the United States after war broke out in Europe.

"My brother-in-law gave me my first real camera, an Eastman Kodak 122 folding type," Mr. Branzetti said. "It was a wonderful day for me to have my own camera."

Because he knew nothing but photography, Mr. Branzetti joined Marceau Studios in Boston, later shifting to Bachrach Studio, one of the nation's best photographic establishments.

From menial darkroom assignments and re-touching work, Mr. Branzetti graduated to camera work as an assistant. His first big break was rather humorous.

"My boss was unable to keep an appointment with Billy and Ma Sunday," Mr. Branzetti recalls. "I filled in and must have been a sight, waving my arms and coaxing in Italian, since I knew very little English. The portraits came out just right and helped me get other assignments with other Bostonians."

Over the next few years the names in Mr. Branzetti's appointment book in-

cluded most of the blueblood of the nation. He caught in his lens members of the Franklin D. Roosevelt family and the Joseph Kennedy family, when the two U.S. Senators and the late President were children. Other names like Count Tolstoi and Admiral Byrd were there alongside the DuPonts, Fullers, Curlys, Saltonstalls, Liggetts, Danas, Schraffs and many others.



Then came the crash of 1929 and Mr. Branzetti, like most others, lost everything.

"With the help of my wife and four children I opened my own studio and it prospered," Mr. Branzetti said. "By 1950 I was able to retire. I came to California to go fishing. The fishing was not too good, but I liked the climate. So I stayed."

After only a few months of ideal life Mr. Branzetti ended his retirement by joining Northrop.

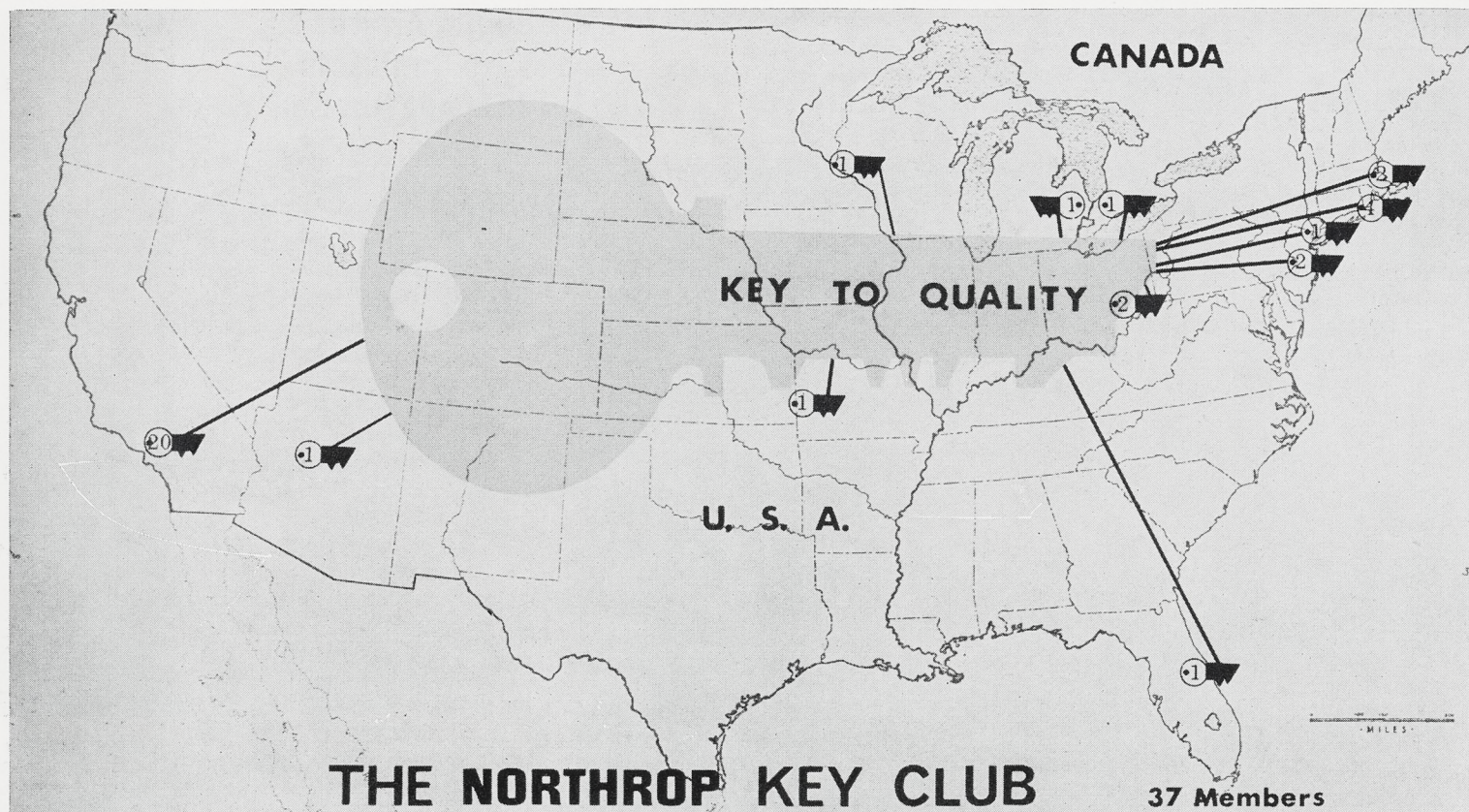
Mr. Branzetti's son, John, is also a photographer and helped establish the Nortronics Anaheim photolab where he still works.

Mr. Branzetti's hobby is painting in oil.

"A good painting, like a good photograph, takes time," Mr. Branzetti said, "time to catch just the right amounts of light, expression and composition."

Mr. Branzetti feels very few people can go before a camera and strike just the right pose the first time.

"You must first get your subjects to relax," Mr. Branzetti said. "If you can find one weak spot, something the subject is apprehensive about, and work it out, then you'll get the best from a subject."



This Is the Key to Quality, Color It Green

A travel guide to quality performance among Northrop's suppliers of aerospace and defense components would have to include such scattered locations as Paramus, New Jersey; Sun Valley, California; Kitchener, Ontario, Canada; Joplin, Missouri; Litchfield Park, Arizona; Windsor Locks, Connecticut; and Bedford, Ohio.

These localities are among the more than 30 in the United States and Canada which have members in the most unique "key club" now in existence.

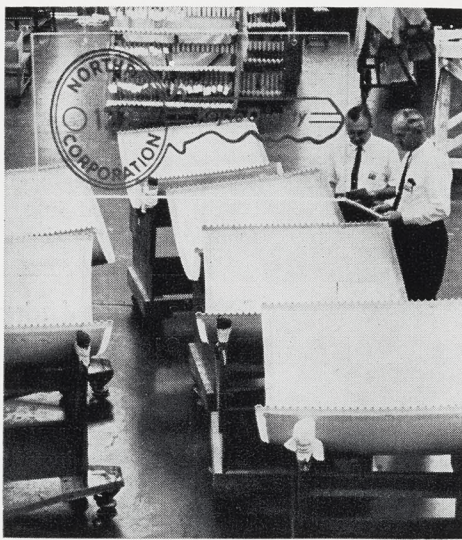
To date, 37 of these members—suppliers of systems and parts for Northrop products—have earned the coveted Northrop Key Quality Award for consistent high-level performance in product quality, compliance with delivery requirements and cost effectiveness.

Twenty-one of the companies earned the award in 1965, the best year in the three-year history of the program.

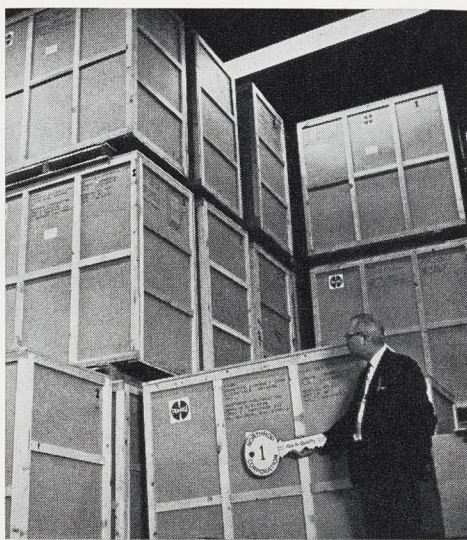
Two awards have already been made this year, and according to administrators of the program at Northrop, the status and benefits of being a Key Award holder is creating interest on a rapidly accelerating scale among the hundreds of company suppliers who can become eligible for this distinction.

One of the most satisfying aspects of the program is the enthusiasm shown by Key Award recipients, their associates, and government officials at all levels.

In recognition of an award made by Nortronics Precision Products department of Norwood, Massachusetts to Speedring Corporation of Warren, Michigan—which manufactures precision



Goodyear Aerospace Company, manufacturer of F-5 and T-38 canopy assemblies, thinks enough of Northrop Key Award program to hang transparent replica of key from ceiling of assembly facility (left photo). Northrop QC expert, Doc Parker (right photo), makes mental note of savings from program, which makes it possible for huge crates to be moved directly to stores without unpacking or inspecting.



machined components for gyroscopes—Michigan Governor George Romney sent this message:

"Congratulations on the selection of your company by Northrop Corporation to receive their Key Award. I am sure the skill of your employees and the ability of corporate management have deserved recognition of this type for some time. Michigan is proud of the contributions you have made to the nation's aerospace program."

As one Northrop executive said, "The Speedring award is typical of the importance suppliers attach to this achieve-

ment. On some occasions, the entire work force of a company gets together for the ceremony. Frequently, there are high-ranking military representatives in attendance, as well as local community leaders and press representatives."

This point is well proven by management quotations from other scattered Key Awardees.

At Akron, Ohio, where General Tire and Rubber was honored, Robert Mahan, manager of the company's Government and Aviation department, said of the award: "It's not easily gained and it's a tribute to all General Tire employ-

ees who made this honor possible. Winning of the award proves once again that production of a quality product is worth the extra effort."

At Long Island, New York, an executive of Liquidometer Division of Simmonds Precision Products, Inc., said: "To companies in the aerospace industry, the Northrop Key Quality Award attests to the highest degree of quality, cost and scheduling control. It was presented as a tribute to Liquidometer for its fuel gaging systems which are currently aboard Northrop's F-5 and T-38 aircraft."

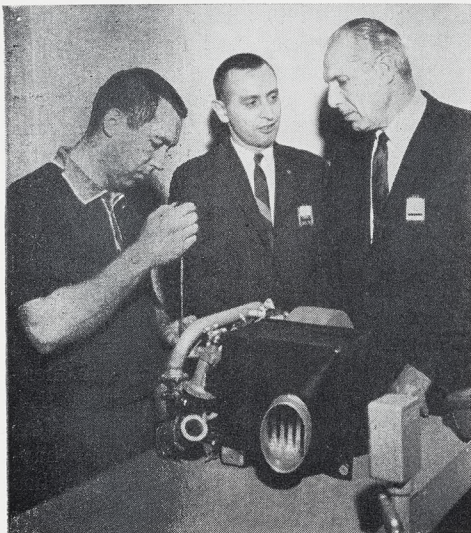
However, the real story of the program lies in the interorganizational and interdivisional aspects of the Key Plan.

Launched three years ago on the premise that supplier excellence should be recognized on a total performance basis, Quality Control and Materiel organizations are now jointly working to a single set of standards for seller evaluation. These criteria—which are recognized and accepted by all divisions of the corporation—place almost equal emphasis on four fronts: quality of workmanship, control of cost, adherence to delivery commitments, and consistency of performance.

In short, administrators of the program sum up these attributes for earning the Key Award with two words—"management integrity."

Another frequently heard phrase among program administrators is "level of confidence." This is another collective assessment which Northrop makes

(See GREEN KEY, page 4)



Awards ceremonies at companies receiving the Northrop Green Key Award may take many forms, but most of the time it is a complete company get-together. The newest member of the Key Club, left photo, is Hamilton Standard Division at Windsor Locks and Broadbrook, Connecticut. R. S. Catlin, Northrop Norair manager of Quality Control, observes how quality is built into F-5 component as Frank Galante, Northrop QC representative (center) describes operation. In center photo, Nortronics



PPD procurement chief, Paul Bohn, addresses employees of American Beryllium Company, Jacksonville, Florida, during ceremony. Three employees of Lomita, California's Aerospace Structures Division of Automation Industries, Inc., right photo, attach tapes from their company's products to model of F-5. On another occasion, during presentation to Goodyear Aerospace Company of Litchfield Park, Arizona, F-5 tactical fighter was flown to plant for employees to inspect.



MANUFACTURING

Splitting Hairs With a 26-Ton Giant

Taking measurements down to 1/30th the diameter of a human hair is not a capability easily associated with a giant of a machine weighing 55,000 pounds.

But at Northrop Norair just such a machine is helping fill a vital role assuring extremely close tolerances required of aerodynamic surfaces on supersonic aircraft.

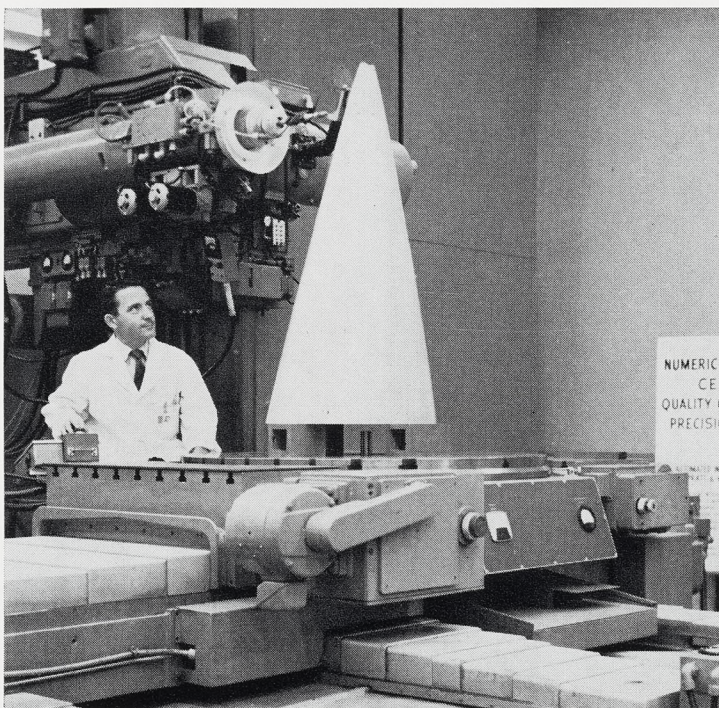
This machine, one of only four of its type ever built, is a Pratt and Whitney 4E coordinate measuring machine.

Capable of being controlled by numerical or manual means, the machine is employed in the Fabrication and Tool Inspection function of Quality Control.

It is designed to aid in checking items containing any number of surfaces as well as bosses or holes which might be on any or all of these surfaces. Delicately balanced, despite its bulk, the machine moves on five axes to inspect location, squareness, parallel and angular relationships, and sizes on both interior and exterior surfaces.

Prior to acquisition of this machine, Norair relied primarily on close quality control being exercised on all details going into each subassembly and proper location of such details in assembly jigs for the accuracy of aerodynamic surfaces.

As the F-5 program began to gain momentum about three years



NUMERIC METROLOGY IN ACTION—Intricate coordinate measuring machine in use at Northrop Norair measures nose cone assembly down to .0001 inch (1/30th the diameter of human hair). E. L. Cornelius is shown at controls of unit that can be controlled by manual or numerical methods.

ago it became apparent that some means was needed to eliminate or reduce the number of specialized check fixtures required. The coordinate measuring machine was obtained and tailored to this task.

"Our original requirement was for 50 to 60 specialized check fixtures, each intricate and costly to build," said Bill

Hunt, Quality Control supervisor. "This machine made it possible for us to eliminate at least 38 of these fixtures."

Since that time the coordinate measuring machine has more than proved its worth in verifying the accuracy of master tools, bonding fixtures, detail parts and assemblies.

Spain Awards Two Contracts To Page Iberica

Wat, S.A. of Madrid, in association with Page Communications Engineers of Washington, D.C. has been awarded two contracts totalling more than one million dollars by the Spanish Air Ministry.

Page Communications Engineers and Wat, S.A. recently formed Page Iberica, a jointly-owned corporation in Madrid, to provide design-through-management service for telecommunications projects in Spain.

A pioneer and world leader in communications systems technology, design, installation and management, Page engineered and constructed the \$19 million UK-Spain System for the U.S. Air Force in 1963.

Page presently is installing three satellite communications earth stations for the Communications Satellite Corporation and a similar station for the Overseas Telecommunications Commission of Australia as part of a worldwide system to provide tracking and data acquisition for the NASA Apollo Program and ultimate relief for the Pacific and Southeast Asia coaxial cable systems.

Wat, S.A., an electrical installation company which has experienced rapid growth during the past five years, has recently expanded into the field of telecommunications.

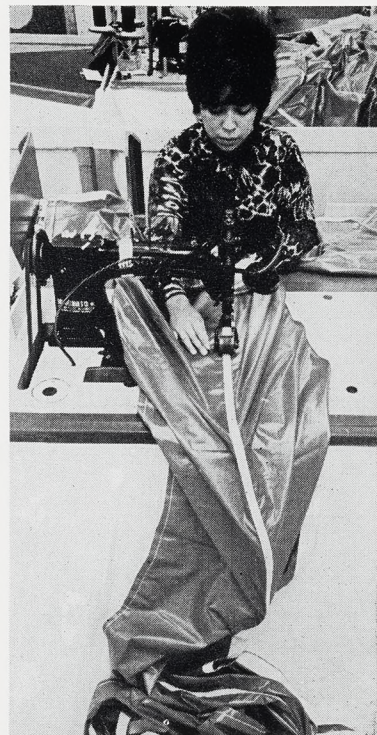
Acacia Club Inducts New Slate of Officers

The Flying Wing Acacia Club held its 25th annual dinner-dance for the installation of new officers and the honoring of past officers recently.

New officers are: Don Riley, president; Otis Teague, vice president; Dick Brown, secretary; Lloyd Raburn, treasurer; and Les Hickman, sergeant-at-arms.

Founded in 1942, the club is open to all master masons employed by Northrop or retired from any of its divisions. Information is available through Dick Brown, ext. 2891, Norair.

Jerry Steiner is the immediate past president and served as installing officer at the dinner.



Carolyn Regalado of Northrop Ventura's Parodynamics Laboratory is sewing three-needle main seam for the Division's steerable Cloverleaf parachute. The Cloverleaf, being developed under contract to NASA's Manned Spacecraft Center, Houston, completed a highly successful aerial drop test at El Centro last month.

Symphonaires Join Industry Festival

Northrop Symphonaires will participate in the annual Industrial Choral Music Festival, sponsored by the Los Angeles Bureau of Music, scheduled for 8 p.m. March 5 at the East Los Angeles Junior College.

Guest conductor for the affair will be Fred Swan of the Bureau of Music. Paul Brizuela is permanent director.

According to Gene Boggess, Symphonaires commissioner, choral groups from numerous companies in the Los Angeles area will perform individually and then combine their voices for a program accompanied by the Los Angeles Philharmonic Orchestra.

The Symphonaires have participated in the event for the past 10 years, Mr. Boggess said.

The concert will be free and open to the public.

CONTINUOUS EARNINGS

Every Series E United States Savings Bond ever sold continues to earn interest as a result of extensions granted on the life of the bonds.

FRINGE BENEFITS

(Continued from page 2)

many other activities.

The Northrop Ventura Rod and Gun Club is one of our very active organizations made up of ardent hunters and fishermen. It sponsors a rather unusual event to climax its year. Each season two members go deer hunting. If one of them gets a deer, there is a big venison dinner, supplemented by baked beans and cole slaw.

We think of this as a sport for the big outdoor male types but one of the recent deer hunters was Barbara Dukes who has been at Northrop Ventura for 15 years. Barbara is expert at hunting and fishing and is a spark plug of the Rod and Gun Club.

One of the biggest words which we have describing the activities of a club is "numismatics". In ordinary English, this means "coin collecting". We have a real authority on coin collecting at Nortronics Anaheim. Orville Mitchell heads up the group there which has 130

enthusiastic members. He has been collecting for 27 years and is a nationally recognized authority on the subject. Perhaps more of us should empty our old piggy banks and join the club.

All of the people in the recreation clubs have learned how much more they get out of their work at Northrop through the associations which they have made. Your management wishes that everyone could be involved in one or more of these activities.

There are choral groups, Bible study societies, the Gem and Mineral Club which puts on such wonderful exhibits, the Art Club which has demonstrated some amazing talent among our people, and many, many more. Our Industrial Relations offices can put any employee in touch with the head of a group involved in an interesting hobby and, certainly, everyone will benefit who takes this means of meeting his fellow workers.

GREEN KEY: Unlocks Door to Opportunity and Profit

(Continued from page 3)

of its suppliers. Key Award winners enjoy a high level of confidence and, as one of the Key Plan developers put it:

"We look upon these companies as if they were an extension of our own operation. We have faith in their management and trust in their products."

When a company reaches this confidence level, its products are subject to minimum inspection when received. Fuel cells manufactured by Dominion Rubber Company of Canada previously required 21 hours inspection per lot (one of six) which totaled 5544 man-hours per year in Norair's Receiving and Inspection department. Since Dominion Rubber has been awarded the green key, inspection time has been reduced to 15.9 hours per year.

This example points up one important reason Northrop management is enthusiastic about the concrete results of the Key Plan. Elimination of parts inspection time alone, from only 16 Key

Award suppliers, produced cost savings of over \$100,000 during FY 65. Other facets of the plan—such as curtailment of travel and need for "special" teams to investigate problem areas—have generated additional savings more difficult to identify, but nonetheless real.

Northrop's Materiel men are also "sold" on cost improvement aspects of procurement operations with Key Award winners. As one Northrop Materiel director said, "Of course, quality of workmanship is what we are all seeking, but a perfect product which arrives weeks late or costs more than it should causes as much havoc with our production schedules and profit position as a poor product does."

A benefit to buyers as well as the supplier is the fact that the green key awarded by one division frequently unlocks the door to another Northrop division.

In effect, the "Northrop Key Program" provides subcontractors with a single,

centralized avenue for doing business with Northrop—it provides a multi-divisional link with its suppliers," as one Northrop Corporate official phrased it.

Many cases of duplication in screening suppliers—and determining their ability to produce quality products on time and within budget—are eliminated.

However, this is not the only instance of duplication within divisions that has been eliminated. Before Northrop contracts with a supplier, a complete survey of that company's facilities, financial and management stability, and quality programs must be made. This data is made available to each division.

The men who perform the surveys are guided by standardized, corporate-wide procedures and policies, worked out jointly between corporate Materiel and Quality Control committees. The committees are made up of Materiel and Quality Control directors, respectively, from each West Coast division, Northrop Space Laboratories, and from

the East, Northrop Precision Products department, Nortronics Marine Equipment department, and Page Communications Engineers.

The men who perform the surveys are, at the minimum, 20-year veterans who are as equally familiar with materiel criteria as quality control. They can quote NASA requirements as well as Air Force, Army and Navy and can support Northrop Ventura's Gemini and Apollo work as well as Nortronics Anaheim Army ordnance contracts.

While there are many other aspects of the Key Plan too numerous to mention, there is one outstanding result that is repeatedly being demonstrated. On more than one occasion, a supplier, having met the criteria of the Key Plan, has found his own business operation improved to the point where he automatically places himself in a more favorable and competitive cost position.

A Northrop "Key" also unlocks the door to opportunity and profit!

Classified

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads. Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

For Sale

Go-Cart, homemade w/belt drive Briggs & Stratton 3 hp eng., \$65. Inglewood, OR 7-7355. A

TV, Sentinel, 21" blonde console, needs work, tubes good, \$10. Torrance, 323-1698. A

Cemetery Lot, dble. interment, El Sereno Sec., Inglewood, \$625. Inglewood, OR 2-8468. A

House, 2-bdrm., 4 yrs. old, 60' x 160' lot, close to Lake Elsinore & Railroad Canyon Lake, \$10,500. Gardena, DA 4-1593. A

VW Bumpers, \$16. Huntington Bch., 714-897-8201. A

Typewriter, Olympia Delux, portable, \$60. Torrance, DA 6-7232. A

Chrome Wheels, 4 Astro, \$100. La Habra, 213-691-0106. A

Trampoline, king size, 5' x 10', strong steel tubing frame 7' x 12', \$55. Box 401. A

Home, 3-bdrm., 2 baths, fireplace, built-in dishwasher & stove; newly redecorated, \$27,500. Torrance, DA 9-6885. A

Telescope, 6" astronomical-type, 3 eye pieces, \$150. Manhattan Bch., 379-4775. A

Truck, 1964, Chevrolet, r/h, 3-spd., \$1750. Torrance, 322-2869. A

Range, elec., Westinghouse, copper tone, 4 burners, auto. oven & timer, \$125. Gardena, 324-0274. A

Rattan Set, 3-pc. sectional w/club chair & matching table, zipper cover, innerspring cushions, \$100. Inglewood, OS 5-7050. A

Freezer, Frigidaire, 13 cu. ft., 90-lb., \$110. Torrance, 320-0596. A

Ford Fairlane, 1958, p/s, r/h, \$250. El Segundo, EA 2-3320. A

Surfboard, 9' 2", Bing, \$50. Camarillo, 805-482-1090. A

Rambler Rebel, 1959, 4-dr. sedan, \$150. Manhattan Bch., 372-0644 between noon & 4 p.m. A

TV, 24", Packard Bell, mahogany, \$75. L.A., 645-6815. A

Outboard Engine, Evinrude, 4-cyl., 5 hp, \$35. Inglewood, OR 1-1660. A

Ducati Scrambler, 1965, 250 cc, extra access., less than 1000 miles, \$595. Hawthorne, 676-9736. A

Bicycle, 26", \$8. Gardena, 329-9484. A

Truck, 1965, Chevrolet, 1/2-ton, V-8, r/h, custom cab, wrap around bumper, trailer hitch, \$1850. Lakewood, HA 5-6844. A

Chevrolet, 1956, Nomad, stick, new tires & chrome rev. rims w/knockoffs, record player, rebuilt 283 eng., \$995. Lawndale, 371-0194. A

Radial Saw, 7" Shopmate, on stand, use as power hand saw, recond., \$50. Inglewood, OR 0-6896. A

Bench Grinder, Mall, on 30" pedestal 1/3 hp 6" dble. wheel 3650 rpm, \$50. Hawthorne, OS 5-3866. A

House, 4-bdrm., family rm., over 1800 sq. ft., fenced yd., 2-car gar., walk to school, shops, 1st trust deed, \$24,900 at 6 1/4%, \$203 mo., \$29,900. P.V. Pen., FR 5-0567. A

Furnace, dual wall-type, Western Holly, 35,000 btu/hr., manual control, instal. sheets, \$40. Hawthorne, OS 6-6415. A

Ford Fairlane 500, 1957, 2-dr., p/s, p/b, new tires, \$250. Torrance, 320-5552. A

Ford, 1957, 4-dr., recent eng. o/haul, good tires, \$295. Gardena, DA 4-2972. A

Washing Machine, Kenmore auto., \$15. Torrance, 371-9730. A

House, 3-bdrm., 1 1/4-bath, fireplace, forced air, heat, lge. lot, existing bal. of GI loan, 5 1/4% is \$21,070, \$22,950 or rent for \$175 mo. Gardena, 213-DA-9-6297. A

MGA convt., 1958, custom top & tonneau cover, \$850. Playa del Rey, 398-1458. A

Bicycle, girl's, 26", \$10. Hawthorne, OS 5-5522. A

Boat Trailer, factory built for 12'-18', adjustable to any hull, lights, \$65. Inglewood, OR 1-2058. A

Home, 3-bdrm., newly decorated, \$24,500. Hawthorne, OS 5-1726. A

Couch, Naugahyde, aqua, foam rubber rev. cushions, 84" long, \$160. West L.A., GR 3-3168. A

Coins, 1960P cents, bu bag, \$75. L.A., 939-3519. A

Transceiver & antenna, Gonset 10-meter, \$125. Fullerton, 529-5327. A

House, 3-bdrm., 20' x 20' rumpus rm., near schools, fwy. & Northrop, fenced yd., 80% or 90% loan, \$23,750. Gardena, DA 9-2904. A

Plymouth, 1965, 2-dr., h/top, auto. trans., r/h, 8000 mi., \$2295. Panorama City, 894-6507. A

NSU Prinz, 1959, sedan, \$175. Hawthorne, 675-4505. A

Datsun roadster, 1965, low mileage, \$1685. Torrance, 370-6529. A

Pontiac station wagon, 1956, low miles, auto. trans., r/h, \$375. Torrance, 324-1270. A

Cabin Cruiser, 27' Chris-Craft, sleeps 4, completely equipped, ship-to-shore radio, bow rail, swim step, many extras, \$5500. Torrance, DA 9-3900. A

For Sale

Suzuki Sport 50, 1965, 4-spd., 50 cc, 1000 miles, \$190. Diamond Bar, 714-526-2348. A

Motor Scooter, Allstate, 65 cc, rebuilt eng., new seat & paint, 3-spd., \$110. Inglewood, OS 6-8893. A

Land, Antelope Valley, 5 & 10 acres, \$250 dn., \$35 mo. Los Alamitos, 431-7056. A

Freezer, 22 cu. ft. Coldspot, \$185. Anaheim, 776-1374. A

TV, 16" Silvertone, portable, \$65. Inglewood, 677-5705. A

Radio & Record player, 1964, Admiral, stereo, 6' antique white & gold cabinet, \$300. Hawthorne, DA 9-9835. A

Desk, modern dk. blonde, cost \$138, \$75. Hawthorne, OS 9-2337. A

Borgward, 1957, 2-dr. sedan, Isabella model, r/h, \$250. L.A., AX 3-2354. A

Rug, 9 x 12, wool, 3 yrs. old, \$25. Inglewood, 674-1796. A

Wet Suit, worn once, size, small, \$20. Torrance, 375-6071. A

Volkswagen, sedan, 1958, new clutch, brakes, \$550. L.A., 931-6937. A

Acreage, 2 1/2-acre parcels, in Antelope Valley, \$15 dn. \$15 mo., \$1495. Torrance, FR 8-1026. A

Trailer, box-type, 4' x 6', wooden bed, 2' steel reinforced wood sides, 26.50 x 15 wheels, tailgate, \$75. Anaheim, 714-776-1023. A

Encyclopedia, World Book, complete vols., \$75. Bellflower, TO 7-4362. A

MG, 1964, 2-dr. sedan, take over \$70 mo. pymnts., \$900. Torrance, FR 5-8804. A

Radial Arm Saw, 10", saw blades, buffing wheels, metal stand, locking casters, 110 or 220 volt, \$150. Torrance, 376-4771. A

Mustang 2+2 fastback, 1965, 289 4-barrel Cruis-O-Matic, disc brakes, full console, extras, 10,000 orig. miles, \$500 & take over pymnts. or \$2800. Torrance, 327-0272. A

Sprite, 1959, new tires, radio, good top, \$695. Redondo, 374-4786. A

House, 4-bdrm., family rm., 2 1/2 baths, 1 acre, horses OK, near Northrop Ventura, \$35,000. Somis, 805-482-1186. A

House, 3 bdrm., patio & fenced block wall, near schools & Del Amo shopping center, \$23,900. Torrance, 325-4789. A

Duplex Bed, 30", foam mattresses & pad, \$45. Gardena, DA 9-5225. A

Piano, upright, Krell, \$85. Hawthorne, OS 9-2610. A

Outboard Motor, 7 1/2 hp Fishing Scott, 1961, lightweight, \$150. Gardena, DA 4-8853. A

Mustang, 1965, p/s, p/b, flake top, air condition, \$2500. Hawthorne, 644-1007. A

VW sunroof, 1963, \$1150. Long Bch., 596-1280. A

Bedroom Furniture, dble. bed w/ortho. mattress & box spring, bookcase headboard, 5-drawer dresser, night stand, light mahogany, \$95. Anaheim, PR 4-2779. A

Volkswagen, 1965 sedan, low mileage, sunroof, \$1525. Long Bch., 633-5938. A

Volkswagen sunroof sedan, 1960, body needs repair, \$700. Rolling Hills Ets., FR 8-2190. A

Organ, Thomas, single keyboard, antique finish, \$275. P.V. Pen., FR 7-3888. A

Stereo Equipment, Eico HF86K, 28 watt amplifier, HF85K preamplifier, HFT94K & HFT-90K tuners, 2 12" Calrad speakers, 1 encl., \$85. Long Bch., GE 9-6432. A

House, 3-bdrm. split-level, 1 1/2 bath, built-ins, dble. gar., 1 mile to ocean, no down to Vets, \$20,000. Redondo Bch., 374-2433. A

Exec. Home, 8 mos. old, 2400 sq. ft., fully carpeted, 3 bdrm. & den, 3 baths, 3 decks, split-level, near all freeways, 10% down, \$35,900. Redondo Bch., 378-7116. A

Cocktail Table, 22" x 60", oval terrazzo top, \$15. Box 402. A

Ford coupe, 1940, 1959 Pontiac eng., solid lifters, racing cam, customized, \$800 or best offer. Hawthorne, OS 5-7371. A

Own-Your-Own-Apt, 2-bdrms., 2 baths, kitchen built-ins, air cond., pvt. patio, pool, gar. & guest parking, FHA 4 1/2% mortgage, \$125 mo., \$18,500. Hollywood, HO 5-5314. A

Range, gas, Gaffers & Sattler, \$25. Gardena, 324-3760. A

T Bird, 1961, convt., all power, new paint, orig. owner, \$1245. W. L.A., GR 2-2928. A

Home, 3-bdrm., 1-bath, hwd. flrs., service porch area, R-2, 50'x150' lot, close to shopping, elem. & jr. high schools, 10 yrs. old, \$20,900. Redondo Bch., 379-6824. A

Mercury Monterey, 1959, good tires, \$350. Inglewood, OR 1-6603. A

Trumpet & case, \$75. Torrance, 324-5422. A

House, 3-bdrm., family rm., dining rm., lge. kitchen, 2 1/2 bath, built-in dishwasher & stove, dble. gar., near beach, \$21,750. Huntington Bch., 536-1621. A

Sewing Machine, portable, Montgomery Ward, \$20. Long Bch., GA 3-1363. A

Revolver, 38 cal. police special, 2 holsters, belt, hand cuffs, shell pockets, \$80. Gardena, OS 5-2159. A

Ford Station Wagon, 1957, 2-dr. ranch wagon, T-Bird V-8 eng., p/s, r/h, trailer hitch, orig. owner, \$275. Rolling Hills Ets., FR 8-5175. A

Home, 4-bdrm. incl. master suite, 3 baths, family rm., custom landscaping, Lunada Bay ocean view, occupied 6 mos., terms, \$50,750. P.V. Ets., 377-4372. A

Motorcycle, 1965 Rex, 500 miles, 95 cc, \$200. Hawthorne, 679-9375. A

Wardrobe, child's, complete, girl sizes 5, 6 & 6x, 11 dresses, coat, capris, raincoat, sweaters, play clothes, \$20. Hawthorne, OS 5-7965. A

Encyclopedias, 15 vol. Britannica Jr., 1957 ed., \$60. San Pedro, TE 3-9430. A

Wanted to Buy

Golf Clubs, set of woods, irons & bag, Wilson staff or equivalent quality. Inglewood, 672-5545. B

Hardtop for 1959 Sprite. Torrance, TE 5-6221. A

Dodge or Plymouth, 1940, mechanical cond. not important. Whittier, OX 3-4117. B

For Trade

Equity in 3-bdrm., 1 1/2-bath home in Desert View Highlands, Palmdale, trade for acreage Palmdale, Lancaster area or home, vicinity Northrop Hawthorne plant. Redondo Bch., FR 5-1064. C

Trade Blue Chip stamp books for Green stamp books. No. Hollywood, 347-3428. C

Rentals Offered

Apt., 2-bdrm., 2-bath, w/lge. patio & dble. garage, built-ins, avail. Mar. 15, \$145 mo. Fullerton, TA 8-2857. E

Apt., 1-bdrm., delux, built-ins, pool, \$95. Redondo Bch., 376-2117. E

Apt., deluxe 2-bdrm., unfurn., beam ceilings, built-ins, gar., 1/2 blk. from beach, \$150 mo. Hawthorne, FR 9-9996. E

Apt., 1-bdrm., built-in stove, closed gar., laundry facilities, \$89 mo. Torrance, 328-6955. E

Apt., 3-bdrm., furn. or unfurn., close to schools & public trans., \$115-\$135. San Pedro, TE 1-3737. E

Apt., 2-bdrm., unfurn., built-in stove & oven, hot & cold water pd., close to Northrop, \$95. Redondo Bch., FR 9-9786. E

Apt., 2-bdrm., unfurn., built-ins, pvt. patio, \$115 mo. Hawthorne, 676-5622. E

Bachelor Cottage, completely furnished, \$75. Hawthorne, OS 6-5464. E

Duplex, 2-bdrm., built-ins, encl. yard, gar., extras, 1 child OK, \$125. Hawthorne, 674-4470. E

Apt., 1-bdrm., utilities pd., furn., parking space, single person desired, \$75 mo. Lawndale, OS 5-9695. E

Studio Apt., 2 & 3-bdrm., flat-type, 2 baths, carports, children OK, \$125 & up. Los Alamitos, 679-5487, 430-1245. E

Studio Apt., 3-bdrm., 2-bath, unfurn., pvt. patio, closed gar., near park & schools, \$165 mo. Torrance, FR 5-0867. E

Apt., 1-bdrm., unfurn. or furn., single, built-ins, refrig. & air conditioning, 20 min. to Norair, \$87.50. Mar Vista, 391-7781. E

Apt., 2-bdrm., 3-minute walk to Northrop, fenced backyard w/playground equip., children OK, \$100 mo. & up. Hawthorne, OS 5-6032. E

Apt., 2-bdrm., furn., sep. dining area, lge. closets, disposal. 4 short blocks to Northrop, utilities paid, \$125 mo. San Pedro, TE 3-2512. E

Apt., 3-bdrm., 2 baths, patio, serv. porch, family rm., fireplace, built-in oven, range, dishwasher & intercom, hot water & trash pd., near Norair, \$175. Hawthorne, 679-1358. E

Apt., 2-bdrm., stove, built-ins, \$110 mo.; bachelor apt., utilities pd., 2 blocks from Norair, \$90 mo. Hawthorne, OS 6-7417. E

Child Care Wanted

Babysitter, full-time, in Hawthorne area, for 3-yr.-old boy. Hawthorne, 676-3575. H

Personals

On behalf of my family, I would like to thank everyone for their assistance & kindness during our recent bereavement. CHET GUZINSKI. L

Typing done in my home, reasonable, pick-up & deliver. Inglewood, OS 6-1475. L

Flying Club, fly Cessna 172 or Bonanza, students OK. P.V., 377-4216, 398-3962. L

Typewriters, old, used, wanted to be sent to Mary Knoll Mission in Chile. Torrance, FA 8-7945. L

For Sale or Trade

Corvette, 1960 h/top, fuel injection, 4-spd., r/h, chrome wheels, good tires, \$1475 or take trade in. Pacific Palisades, GL 4-7262, GL 4-3931. M

Boat, 16' w/trailer, \$295 or trade for boat, 14' w/trailer. Hawthorne, 676-3912. M

Cinerama Theatre Party Announced

A Northrop-wide theatre party for the March 20 showing of the Cinerama feature "Battle of the Bulge" was announced this week by combined NRC organizations.

The 5 p.m. Northrop party will be at the Pacific's Cinerama Theatre, 6360 Sunset Blvd., Hollywood.

Three hundred reserved loge and orchestra seats have been acquired and will be sold through NRC for \$2.60 and \$2.35 respectively, reflecting a 40-cent per ticket saving.

Tickets may be purchased through all NRC outlets with a March 16 cutoff date.

SAFETY FEATURE

U.S. Savings Bonds cannot be used as collateral because only the registered owner can redeem them. This is one of the many safety features of Savings Bonds.

AND THANKS, GENERAL



Major General Ben I. Funk (right), commander of the Air Force Space Systems Division, AFSC, receives plaque and citation from Northrop Nortronics' Dave Kessler. Honors recognized general's participation in Joint Technical Conference under sponsorship of five top technical societies. Mr. Kessler is a senior member of Orange Empire Section, American Society for Quality Control, one of the five groups.

MEDICARE: Group Insurance Plan to Change, Avoids Duplication

(Continued from page 2)

er would charge much more to provide the entire Medicare hospital and voluntary doctor insurance package. Your cost is \$3 per month.

Effective July 1, 1966, the Northrop Corporation plan of Group Insurance will reduce benefits by the benefits available as a result of the Medicare Law. For you who have the Northrop Retired Major Medical Plan of insurance, there will be a new plan of insurance provided at a reduced rate which will not duplicate the Medicare coverage.

A similar change will be made in the insurance coverage of those people still working after age 65 which will be of benefit to them. So do not deprive yourself of complete coverage by failing to enroll for the Medicare benefit plans, both the basic hospital plan at no

cost and the voluntary plan for doctor services at \$3 monthly cost.

The Medicare benefits will be effective July 1, 1966, but you must enroll before March 31, 1966.

If you are less than age 65, but your wife/husband is age 65 or older, Medicare benefits apply to the person over 65. But enrollment is necessary to obtain the hospital, doctor coverage.

If you were not age 65 prior to January 1, 1966, your first enrollment period runs for 7 months beginning with the third month immediately before the month you reach 65, and ending 3 months after you are 65. For example, if you reach 65 in August, you may sign up any time between May 1 and November 31.

To assist eligible individuals, and especially those who are currently employed, the Social Security offices in the greater Los Angeles area have arranged special evening hours of operations. This convenient service is being provided from 5:30 to 8:30 p.m. each Wednesday by the area offices which include those at:

Inglewood, 608 E. Manchester Blvd.; Los Angeles, 419 South Hill St.; Torrance, 1408 Crenshaw Blvd.; Santa Monica, 1514 Sixth St.; Van Nuys, 4631 Van Nuys Blvd.; and Santa Ana, 1438 East First Street.

These and other Social Security offices are open Monday through Friday from 8:30 a.m. to 4:30 p.m.

The Long Beach office located at 1235 Pacific Ave. will remain open Thursday evenings from 4:45 to 6:45 p.m.

The Ventura office at 4274 Telegraph Road, will be open from 5:30 to 8:30 p.m. on both Wednesday and Thursday evenings. No evening hours have been scheduled by the Lancaster office.

Whether working or not — sign up if you are eligible. If you have the slightest question as to whether you should enroll, contact your Social Security office right away.

Going my way?

Rides Wanted

7 a.m. — 3:45 p.m.

Hawthorne & 190th, Torrance. Betty Evans, Norair, ext. 2544, 370-4101. 2

7:30 a.m. — 4:15 p.m.

Atlantic & Valley Blvd., Alhambra. Adriana Franco, Norair, ext. 2389, 283-5415. 3

Gould Ave. & Hermosa Ave. or Manhattan Ave., Hermosa Beach. Penny Prouty, Norair, ext. 1458, OS 9-6520. 3

La Brea & Centinela, Inglewood. Coleen Conner, Norair, ext. 1972. 3

8 a.m. — 4:45 p.m.

Manchester & Inglewood Ave., Inglewood. Sidney Wanger, Nortronics Anaheim ext. 1043, 677-4134. 5

Vermont & Olympic, Los Angeles. H. Shibata, Nortronics Hawthorne ext. 641, 388-1667. 5

Sepulveda & Hawthorne Blvd., Torrance. Virginia Davis, Norair, ext. 2021, 325-4789. 5

Crenshaw & Stocker, Los Angeles. Evelyn M. Martin, Norair, ext. 1611, 679-7154. 5

From San Fernando Valley-Topanga or Devonshire St. to Hawthorne. S. D. Parr, Nortronics Haw., ext. 670, 527-1590. 5

Orange Ave. & Del Amo, Long Beach. W. H. Covert, NSL, ext. 2721, GA 3-1363. 5

Rides Offered

8 a.m. — 4:45 p.m.

Manchester & Inglewood Ave., Inglewood. Sidney Wanger, Nortronics Anaheim ext. 1043, 677-4134. 15

Vermont & Olympic, Los Angeles. H. Shibata, Nortronics Hawthorne ext. 641, 388-1667. 15

Broadway & 11th, Santa Monica. North of Santa Monica Fwy., west of Bundy Blvd. to heart of Santa Monica. Earl Koons, Norair ext. 2708, EX 4-3345. 15

From San Fernando Valley-Topanga or Devonshire St. to Hawthorne. S. D. Parr, Nortronics Haw., ext. 670, 527-1590. 15

Orange Ave. & Del Amo, Long Beach. W. H. Covert, NSL, ext. 2721, GA 3-1363. 15

GATES SUCCEEDS GEN. TIMBERLAKE IN INTERNATIONAL

C. R. (Bob) Gates yesterday succeeded General Patrick W. Timberlake as vice president—International, and Frank S. Perigo replaced Mr. Gates as manager of Marketing at Northrop Norair.



Gen. Timberlake

General Timberlake, who retired from the Air Force in 1957, has announced his "second retirement," to become effective at the end of this year. Until that time he will retain the title of Corporate vice president and in addition will serve as special assistant—International.

He will perform assignments on request of the International Division, Corporate management, the divisions and Northrop subsidiaries.

Mr. Gates, Norair Marketing manager for the past four years, joined Northrop in 1955 as a development planner and later became director of Development Planning.

"Mr. Gates brings a wealth of management experience in both government and industry to his new duties, and we welcome him to the leadership of our International team," President and Chairman Thomas V. Jones said in announcing the appointment.

Mr. Perigo has been Corporate director of Domestic Marketing operations. He joined Northrop in 1964 as Corporate director of Manned Aircraft Marketing. Mr. Perigo was a marketing executive with Raytheon Company and General Dynamics Corporation, respectively, prior to his association with Northrop.

General Timberlake is credited by Mr. Jones as being "largely instrumental in building a sound business posture for our company in many areas of the world."

In their new positions, both General Timberlake and Mr. Gates will report to Glenn R. Lord, Corporate vice president—Marketing.

EARNINGS

(Continued from page 1)

with \$160,276,000 in the first half of last year.

"As indicated earlier, the second quarter results show a substantial improvement over the first quarter," Mr. Jones said. "The per share earnings of 66 cents were 60 percent higher than the 41 cents per share earned in the first quarter of the current fiscal year," he said. "This higher net income reflects the contribution to earnings of the rapidly expanding communications product lines, as well as electronics and aircraft deliveries to a growing list of customers," Mr. Jones said.

The company's sales backlog currently totals approximately \$398,000,000 not including some \$90,000,000 in aircraft work now in production but still awaiting final contract negotiation. This compares with a backlog of approximately \$360,476,000 a year ago, according to Mr. Jones. The backlog is spread over a range of increasingly diversified programs in communications, electronics, ordnance products, missiles and space.

SECRETARY EXECUTIVES



Officers-elect of new Los Robles chapter, National Secretaries Association, are charter members as well. From left, at Los Robles Inn, Thousand Oaks, for installation dinner are Sylvia Savage, president, North American Aviation Science Center; Billie Linebarier, first vice president, Northrop Ventura; Frances Jewett, second vice president, NAA Science Center; Marion Morioka, secretary, Purolator Products; and Jodi Letts, treasurer, Packard Bell Electronics.

CLOVERLEAF: First in a Series Of Tests Called a Complete Success

(Continued from page 1)

concept, and Mr. Coe, who worked on the wind tunnel program, is a specialist in fluid dynamics. Mr. Knacke is chief of the Technical staff and an advisor to all parachute system programs in the Division.

The first flight test of the 56-foot Cloverleaf used a 5000-pound test module — developed by the Division specifically for the test program — and was dropped from an aircraft flying at 6000 feet.

With only minor modifications, the test vehicle, frequently called a "weight bomb," can simulate a 14,000-pound payload, according to Larry Parsons.

The test was designed only to demonstrate deployment and opening characteristics of the parachute. Guidance and control techniques will be demonstrated later in a planned series of aerial drop tests.

At the press conference, a NASA official said, "From the standpoint of performance, I would say that we had an unqualified complete success."

"Anytime you have an unsymmetrical parachute, you look for and expect deployment problems, where it does not inflate and so forth. The Cloverleaf has a very, very positive inflation tendency, which means that we don't have

a big problem area that we thought might occur."

The Cloverleaf configuration consists of three lobes which, when descending, look very much like three parachutes together. Two of the lobes have flaps in one side that can be modulated, or moved up and down, to change the glide ratio of the parachute.

(It is the modulation capability which caused Northrop Ventura Vice President-Technical George Grogan to comment at the recent Management Club panel discussion that the Division was two years ahead of the state-of-the-art in steerable chutes as might be applied to land landing of spacecraft).

In response to questions about specific applications of the Northrop steerable chute, NASA's Lee Norman said:

"Basically we are going to develop the technology so that management can have an option of landing modes for future spacecraft, not be restricted just to land, but to be able to land on land or water."

Paraplegic Team Wins Keg Honors

The Northrop Ventura paraplegic team's 2120 won them high series honors in the Paraplegic Men's Foursome bowling league, competing Friday nights at Rocket Bowl, Canoga Park, Commissioner Zack Silvers reported.

Team members are Gus Johnson, captain; Lane Tester, Fred Williams and Lloyd Martin.

Mr. Silvers said the foursome is behind in games won, but a glance at their record indicates they would offer tough competition for any Ventura keggers.

The Men's Scratch League is entering final weeks of the schedule at Conejo Bowl, Thousand Oaks, with only a 6½-game spread between the leading Team 5 and fifth place Team 1.

Season high totals are: Individual game, Wes Steyer, 253. Individual series, Hugh Daly, 610. Team game, 767, Team 1, and team series, 2102, Team 5.

BONDS MICROFILMED

Records of around 650,000,000 U.S. Savings Bonds are recorded on microfilm by the Treasury Department, so that any bond lost, stolen or destroyed may be replaced. This service is at no cost to the bond owner.

DSSP Program Staff: 'Right Arm of Navy'

Northrop Corporation has marshalled an impressive and highly versatile array of talents and skills to perform assigned tasks in the U.S. Navy's Deep Submergence Systems Project (DSSP).

Working out of headquarters at Nortronics Anaheim and Washington, D. C., the team has ranged far and wide in recent weeks to work with many groups and organizations.



Mr. Krapf

Nortronics was selected by the Navy as its systems engineering support contractor for DSSP, the most extensive underwater research and development program to date. It is a mind-stretching and far-reaching effort to develop new methods and equipment for deep sea rescue and recovery and to improve man's capability for living and working underwater.

The Nortronics program is headed by Art Krapf, a veteran submariner and scientist, a former U.S. Navy captain and one-time director of the Naval Research Laboratory at Washington, D.C.

Mr. Krapf directs a full-time staff of 22 specialists. Sixteen are at Nortronics Anaheim, the remainder in Washington under Deputy Program Manager D. A. Delo. Gus Duke supervises the over-all Engineering unit.

Team skills cover many fields, human factors, hydrodynamics, reliability, electronics, acoustics and systems analysis to name a few.

"Our team contains a majority of basic talents we require," Mr. Krapf said. "More important, we can call on any of Northrop's many resources to meet special requirements."

Mr. Krapf indicated valuable program contributions have been made and will continue to be made by Norair, Northrop Space Laboratories, Ventura and all of Northrop Nortronics.

A five-year, multimillion dollar project, DSSP is aimed at improving navy capabilities in four basic undersea operations: the recovery of survivors of submarine disasters; creation of underwater bases where divers may live and work; recovery of large ships sunk below the ocean surface; and the development of a submersible, manned vehicle which could recover aerospace components and conduct oceanographic investigations at a depth of 20,000 feet.

Originally assigned to the Navy's Special Projects office, the program gained new status recently with the creation of a special DSSP project office under the Chief of Naval Material with administrative support from the Bureau of Ships.

As systems engineering support contractor, Nortronics is assisting the Navy in the management, integration and coordination of all phases of the program. This ranges from the establishment of criteria for the design of all systems and the training of personnel to the analysis of performance and missions.

"We fill an unusual role in this project as a sort of strong right arm for the Navy," Mr. Krapf said. "We will not fabricate hard-

ware, but will work closely with those who do.

"Northrop's work with DSSP will certainly lead to the beginning of a capability in an entirely new field," Mr. Krapf said.

Over the past four months Nortronics DSSP team members have taken part in a wide range of activities. They have helped formulate a Project Master Plan (PMP), offered advice on facilities, took part in training plans, worked closely in human engineering fields, reviewed the efforts of project contractors, studied rescue and support vehicle criteria, and participated in conferences covering DSSP theory, rescue vessels, controls and displays, sensors and many other topics.

One interesting endeavor related to the Sea Lab program which takes man into the sea to work and live. Sea Lab I descended off Bermuda in July 1964 with four men for an 11-day period.

Sea Lab II was lowered off La Jolla late last year and stayed below 45 days with 28 men, working in shifts, taking part. Nortronics is currently preparing a detailed physiological evaluation of this program with the able support of the Northrop Space Labs.

Sea Lab III will go down at a point to be selected in early 1967, also for a 45-day stay. Nortronics is presently writing operating specifications for this effort.

Among DSSP team members enthusiasm for the over-all program is running especially high, Mr. Duke reports.

"We all find the work challenging and interesting," Mr. Duke said. "There is a feeling of pioneering, of taking part in something with a great deal of future."

NORWAY

(Continued from page 1)

II, when pilots of other nations ferried bombers and transports from this country to their home bases. And it is the greatest number of Northrop F-5's to be delivered in one flight since the airplanes began entering the defense inventories of allied countries.

The F-5 has been ordered or programmed for nine air forces throughout the world. It was chosen by Norway after extensive evaluation of other aircraft.

The three Norwegian pilots participating in the flight were Captain Per Ekholdt, Captain A. Madsen and 1st Lieutenant R. Ostby. The F-5's being flown to Norway incorporate a number of changes required by their intended use in an Arctic environment.

The route of the F-5's calls for stops in Labrador, Greenland, Iceland and Scotland.

Equipped for a ferry mission, the F-5 is capable of flying up to 1600 miles nonstop. With this capability or through the use of in-flight refueling, the F-5 can be deployed anywhere in the world.

The long flight to Vietnam was conducted under standard USAF in-flight refueling procedures in which the accompanying KC-135 tankers continuously topped off the fuel tanks of the fighters on a rotating basis.

NORTHROP NEWS

NORTHROP VENTURA

Published biweekly by Northrop Corporation, Beverly Hills, California

Vol. 24, No. 5

March 16, 1966

Skoshi Tiger Group Gets Shot at North

Northrop F-5 tactical fighters flew strike missions against Communist North Vietnam for the first time late last month, according to Second Air Division headquarters.

The F-5's, flown by pilots of the 4503d Tactical Fighter Squadron, have been attacking Viet Cong targets in the south since the beginning of Project Skoshi Tiger last November 1.

Statistics released by the Air Force indicate that F-5 pilots have dropped more than 7400 bombs, fired almost 4900 rockets and expended almost 650,000 20mm cannon rounds between November and late February.

Pilots of the 4503d have logged about 2450 sorties against the Viet Cong, claiming 231 enemy dead. The F-5 squadron has been credited with 1931 buildings destroyed and another 1701 damaged.

While no official information on targets damaged by the first mission of the F-5's into the north, the Air Force said that the planes attacked routes of travel.

The Air Force also announced that four pilots of the 4503d had each logged their 100th combat sortie in an F-5.

Included among the four was Squadron Commander Colonel Frank N. Emory.

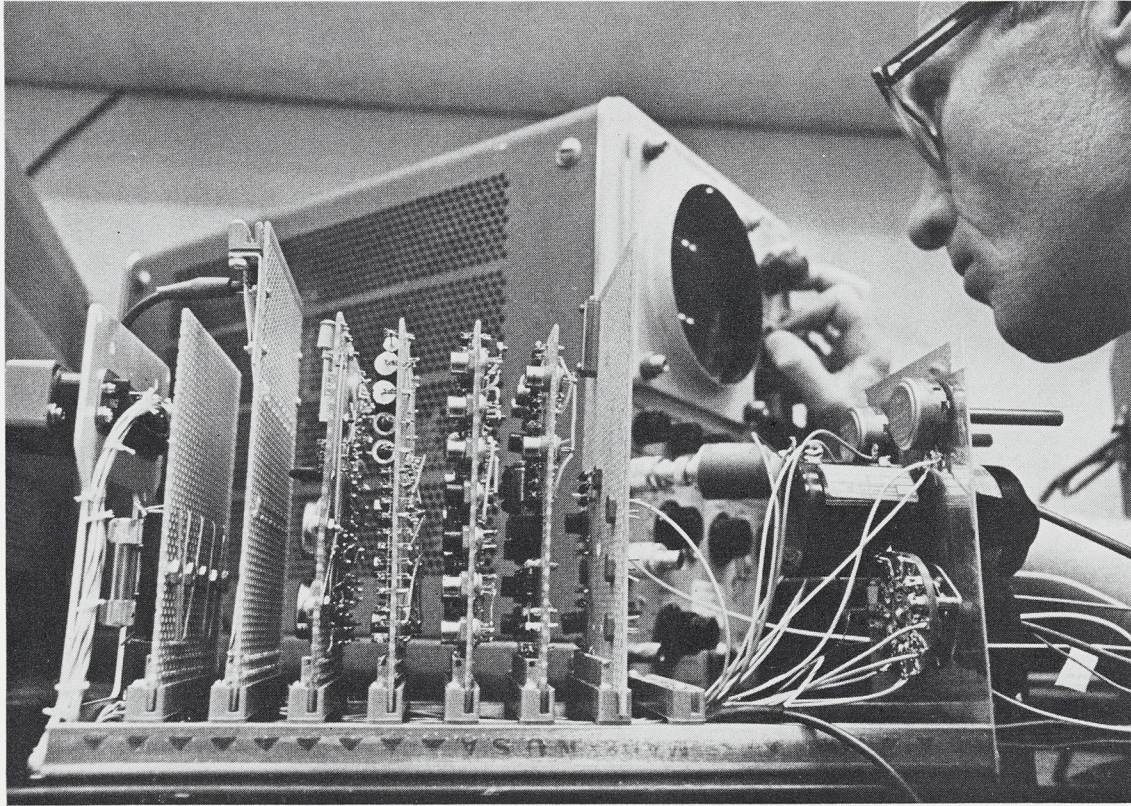
Communications Tops M-C Program Again

Continuing their 1966 theme of Communications in Management, Northrop Ventura Management Club will hear Ernest L. Loen speak on "Communications, What It's All About," April 6.

Mr. Loen will appear during the meeting at the Los Robles Inn in Thousand Oaks, opening at 5:30 p.m.

Founder and principal of Ernest L. Loen and Associates, nationally known management consulting firm, the speaker is listed in the international edition of Who's Who. He was a member of several of President Eisenhower's committees.

ASCAC HARDWARE



First circuitboards for Northrop Ventura's interim Anti-Submarine Classification Analysis Center system are checked out electronically by Otto L. Goerisch, laboratory

development technician. Purpose of center is to permit rapid, accurate identification of contacts made by anti-submarine surveillance units.

OILMEN HEAR PLAN TO MOVE OIL RIGS, MEN UNDER WATER

The oil industry probably didn't get the answers to all their problems related to offshore drilling at the 1966 Offshore Exploration Conference in Long Beach, but as the result of the systems approach used by Northrop Nortronics' Leon Danforth in a comprehensive analysis of undersea platforms, oilmen now have a better idea of what questions to ask.

A senior hydrodynamicist on the Deep Submergence Systems Program (DSSP) staff at Anaheim, Mr. Danforth's 87-page document discussed the feasibility and ramifications in design, mooring, emplacement, manning and servicing an undersea oil drilling operation at depths of 200 to 1200 feet.

The paper covered hardware conceptual designs, life support equipment and techniques for installing and operating a platform in which a crew of 30 to 45 men could work two-week shifts on the ocean floor.

(See DRILLING, page 6)

Essay Competition Opens For Annual Scholarships

Competition for a \$750 and \$250 scholarship was opened March 7 to Northrop Ventura employees' sons and daughters graduating from high school between January 1 and June 30 this year.

Sponsored by Northrop Ventura Management Club, the annual B. J. Angell and Vivian L. Long Memorial Scholarship Awards are based on an essay contest, evaluation of scholastic records, school and activity participation, and faculty appraisal.

The essay of 1500 words or less may be written on any subject the contestant chooses. Original drawings or photographs may be included at the option of the writer.

Application forms should be sent to Stan Boyle, Northrop Ventura Marketing department, Administration Building, Room 337, not later than April 25.

The scholastic records trans-

cript must reach the Management Club scholarship committee by May 16, along with the essay.

The awards will be announced in June.

Additional information and entry forms may be obtained from Mr. Boyle, Scholarship Committee chairman; Richard Warner, Aero Instrument Facility; or Orville S. Reed, El Centro Facility.

Astronaut's Family Asks Heart Fund Gifts

Instead of sending flowers to the family of Astronaut Charles Bassett, Northrop Ventura employees may pay their respects to his memory by contributing to the Heart Fund.

Astronaut Bassett died recently in a T-38 plane crash at St. Louis, Missouri. His family requested the Heart Fund contributions.



Mr. Bassett

Northrop Ventura by his informality and friendliness during a visit last May. He addressed an afternoon gathering of employees and a dinner meeting of the Management Club.

He toured the Parolab and the engineering building, chatting with the women who make spacecraft parachutes and meeting many of the people responsible for the design, development and testing of the Gemini earth landing system.

Contributions may be sent to: Astronaut Affairs Office, NASA Manned Spacecraft Center, Houston, Texas.

Apollo Work Praised by NASA, Steyer

The recent successful launching of Spacecraft 009 from Cape Kennedy marks the completion of a major milestone in the development and qualification of the NASA directed Apollo space program.

On February 26, after a four-day inclement weather delay, the spacecraft was launched on a 5,500 mile flight downrange to Ascension Island in the South Atlantic.

After a 40-minute flight which reached an altitude of 310 miles, the craft, seared by 4000 degree reentry temperature, was gently dropped into the Atlantic by a unique cluster of three 83.5-foot diameter Ringsail parachutes. Recovery was completed by the USS Boxer, which was about 40 miles away at the time of impact.

The parachutes and the sequence controller which automatically activates them are a part of the recovery system developed and qualified by Northrop Ventura under contract with the Space and Information Systems Division of North American Aviation, Inc.

Returning from Cape Kennedy, after this first suborbital flight, Apollo Earth Landing System Program Manager Wes Steyer, praised the outstanding effort of Northrop Ventura personnel in meeting the stringent requirements of the program.

Mr. Steyer described the requirements of Block I (first of two major program segments) as "the development and qualification, through both laboratory and field testing, of an automatic parachute landing system for the heaviest NASA payload to date."

Mr. Steyer stated that "everyone on the Apollo Program is part of the team and can properly share in this success. The words team and teamwork have been used and reused, but how else can you describe the tremendous effort of so many people, throughout this Division, in developing, and qualifying this most sophisticated of parachute landing systems. Such an effort is not possible without complete participation."

(See APOLLO, page 6)

VETERAN OF THE STAGE

Lupe Lends Voice to Aid Education Fund

A mezzo soprano who works at Northrop Ventura will sing in support of higher education March 19.

Lupe Zuniga, secretary to Chuck Merlian, on the staff of the assistant general manager, will perform as one of nine acts at the 1966 Rotary International variety show.

The annual event is scheduled for 8:15 p.m. in the California Lutheran

College auditorium, Thousand Oaks. Proceeds go to the Rotary International scholarships fund.

Miss Zuniga has performed in little theaters throughout the area, including Plaza Players Theatre, Oxnard; Conejo Players Theatre, Thousand Oaks, and Valley Musical Comedy Players, Thousand Oaks.

Her credits include Luisa in West Side Story; Lauretta, the female lead in Gianni Schicchi, and Musetta in La Boheme. She has also appeared on KCOP-TV as guest artist on "Hispanorama." Lupe is presently associated with the Desilu Professional Theatre

workshop in Hollywood.

Under the Rotary scholarship program, two or more \$400 scholarships are awarded annually to high school graduates in the area. A \$1000 scholarship is presented California Lutheran College for a foreign exchange student, and \$250 for a student of music at the college.

Henry Still, head of public relations for Northrop Ventura is chairman of public relations and of the variety show for Rotary.

Cash prizes amounting to nearly \$700 will go to the nine acts selected from among local talent to appear on the show.



Miss Zuniga



Wes Steyer, Apollo ELS program manager, enthusiastically describes team effort of Northrop Ventura employees during development and qualification phase of parachute system.

FRINGE BENEFITS

Five Education Programs Keep People From Becoming Obsolete



By WILLIAM LARRABEE
Vice President—Industrial Relations

I know of a company which did very well in the old days manufacturing and selling buggy whips. Since these were the very finest buggy whips, it is clear that a great deal of advanced technology and research and development went into the product and that the people on the assembly line knew exactly how to build them. As we all know, however, the motor vehicle put quite a crimp in the buggy whip business. It is doubtful that a buggy whip design engineer or assembler would now find much of a market for his talents.

Many of us tend to forget that exactly the same thing which occurred in the buggy whip keeps right on happening in every business every day. We don't have to look very hard to see it in our own field of work. Our industry's products of 20 years ago are just about obsolete.

Rosie the Riveter of World War II days is giving way to processes such as bonding. The electronic assembler is seeing more and more printed circuitry and microminiaturization. The conventional milling machine operator sees numerically controlled equipment all around him. The engineering talent which could tell us a few years ago how to design to those fearsome 300-mile-an-hour speeds isn't of much use in the fields of ballistic missiles and supersonic transports.

In law, in finance, in contract administration, in procurement, in quality control and, as a matter of fact, in just about every phase of our business the things that we knew 20 years ago are of constantly dwindling value in modern industry.

All of this means that people can become just as obsolete as buggy whip designers unless something is done to update their knowledge and capabilities. For that reason, any forward looking company makes educational programs available in all kinds of fields. Generally speaking, these are directed toward helping people to help themselves in this rapidly changing environment.

Northrop is no exception to the general rule and the educational opportunities which it offers Northrop people are tremendously varied in nature. There are five different kinds of programs. The first is called our "In-Plant Training and Educational Program" and is designed to offer courses on the premises where there is a sufficient number of interested people to set up a class.

These classes are also organized where there is a foreseeable need for training in view of the future introduction of some new tool or method which requires added skills. The courses are put

on by qualified instructors.

The next program, and one which is very widely used throughout the corporation, is the "Educational Refund Plan." A great many people attend school off hours in order to qualify themselves for more responsible assignments or to learn how to do a better job. The company picks up a good portion of the cost of these schooling programs.

In the area of higher education, the company has its "Graduate Study Program" which gives the candidates for advanced degrees at colleges or universities real incentive to go on with their education. There is also a "Resident Study Program" which provides for assistance in connection with full-time scientific or engineering study at the postgraduate level.

Last, there is the "Directed Attendance Plan" which provides for sending people, as part of their jobs, to short courses, seminars, workshops and university executive programs. Hundreds of these types of courses are given each year by government and industry in specialized fields to keep industry functioning smoothly in the light of rapidly changing conditions and ground rules.

Within these five programs the company offers real help to the individual who wants to keep up with the times. This does not mean that either the company or its people are doing enough. While hundreds of our people are now involved, all of us in management hope that the number using the programs can be increased substantially from year to year.

This can be done in two ways. In the first place, the company can do more to publicize its programs and to point up the need for continued education. It can help counsel people who want career development opportunity. Our divisional industrial relations people are being asked to put special emphasis on this work.

In the second place, individuals themselves can look around them and realize that to move ahead, or even to stand still, in these days of constant change requires increased job knowledge and a good look into the future. They can then do something about it by seeking the help of their Industrial Relations office.

There is a corporate directive (Corporate Policy Directive No. 15) which describes these various plans. Furthermore, each division has internal bulletins of its own supplementing the corporate directive.

We hope that when we look at our educational programs a year from now we will see them used on an even broader base.

GI's Write Thanks For Gift of Pizza—'Most Missed Food'

A letter of thanks for a shipment of pre-cooked frozen pizzas to a Marine squad in Vietnam has been received by Northrop, which started the delicacies on their way earlier this month.

PFC James E. Halverstadt, son of Guy Halverstadt of Northrop's Palmdale facility, had written on behalf of his squad to the Boulevard Delicatessen and Liquor Store in Palmdale, where Private Halverstadt bought pizzas before being sent to Vietnam.

He told the manager, Robert Cundiff, that pizza was the most missed food among members of his squad and asked how the group might purchase a selection. Mr. Cundiff offered to supply the pizzas free if Northrop could arrange shipping transportation.

The results of the cooperative effort are evident in Private Halverstadt's letter:

"The fellas and I would like to thank you very much for your kindness and generosity in helping with the shipment of the pizzas . . . We didn't have the equipment to heat them, but made use of what was at hand . . . But no matter how we ate them they were good American pizzas and made 24 Marines very happy . . ."

Last Call Sounded For Mexico Tour

March 28 is the deadline for reserving a seat on the NRC-sponsored springtime tour of Mexico April 29 through May 14.

A final organization meeting is set for 7:30 p.m., March 22 at the NRC Clubhouse, Hawthorne, and will include full details and a film report on Mexico.

Total cost is \$320 and includes jet air fare, hotels, sightseeing and breakfast. The tour includes stops at Mexico City, Acapulco, Guadalajara and many other points of interest.

Contact Personnel Activities for information.



Ho-hum, another typical day in the life of a junior executive, says Christopher Ronald Schmitt, two-month-old grandson of George Schmitt of Norair's Property Management unit.

Northrop to Assist Peace Corps Drive

Northrop will again cooperate with Peace Corps officials in conducting an in-plant recruiting program for qualified employees who are interested in joining the Peace Corps.

Arrangements have been made to conduct interviews with Peace Corps representatives at Northrop on March 31 and April 1. The Corps has enjoyed immeasurable success after four years of establishing itself as a significant tool for motivating self-help in emerging nations.

The list of job categories covers over 300 job classifications. Persons with training in math and science are in demand and persons with training in agricultural and farm backgrounds usually rank second. This does not exclude, however, a demand for carpenters, machinists, nurses and instructors.

A 25-month leave of absence will be granted successful applicants for the Peace Corps. Although tours are for 24 months, Northrop will allow an extra month for returning volunteers. This policy, which is included in the manual "Working With Northrop," provides for leaves of absence without pay. During such (See PEACE CORPS, page 5)

JOHN FISHER JOINS MARKETING STAFF

Defense Systems Advisor to Study Corporate Capability

John H. Fisher, an authority in both the United States and Europe on the technology and application of defense systems, has been appointed to the newly created position of Defense Systems Analysis administrator in the Corporate Marketing operation.



Mr. Fisher

A specialist in command systems for tactical operations, Mr. Fisher will be responsible for analyzing potential business to see if the use of capabilities of more than one element of the company would enhance Northrop's competitive position.

In this capacity he will serve as an advisor to Glenn R. Lord, Corporate vice president — Marketing. He will also advise Marketing in more general areas which might enhance the com-

pany's responsiveness to defense requirements.

"On some occasions there are defense requirements, particularly in the area of complete systems, to which a Northrop division or subsidiary cannot respond because of its specialized capabilities," Mr. Fisher said.

"However, it is possible that the technology lacking at one location may be available at another within the corporate network."

Although Mr. Fisher's personal responsibilities are in the area of defense requirements, he said that the Deep Submergence Systems Program (DSSP), of which Northrop is industry manager for the Navy, is an example of the success possible from a total company effort in gaining new business.

The deep submergence program, headquartered at Nortronics Anaheim, was a corporate proposal last year based on the total company capability. North-

rop is responsible for systems engineering support—software rather than hardware—for the five-year multimillion dollar Navy project (NORTHROP NEWS, March 2, 1966).

Valuable contributions to DSSP are being made by Norair and Ventura divisions, Northrop Space Laboratories and all of the Northrop Nortronics facilities.

Mr. Fisher came to Northrop from System Development Corporation, where he was on the staff of the vice president, Defense Systems Division. He joined SDC in 1957, when it was a division of the Rand Corporation, as an executive assistant.

During his stay with SDC he served variously as assistant to the manager of System Applications, leader of the 500-man group that installed SAGE computer programs at field sites throughout the country, assistant manager of the SAGE computer program project, and

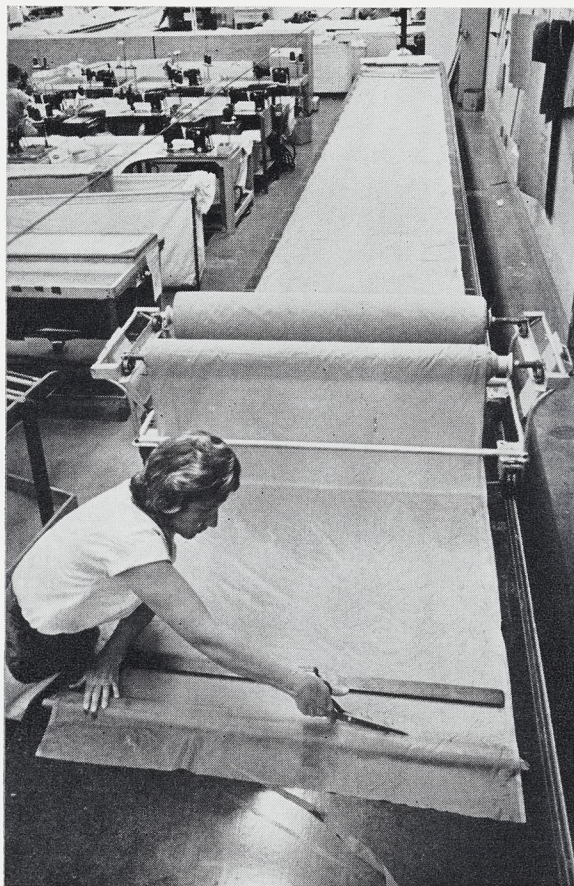
technical assistant to the president.

In 1962 he went on leave of absence from SDC to serve as air defense technical advisor to the U. S. mission to NATO. His assignment at NATO was to establish the manner in which the United States would contribute to the air defense system the organization intended to build.

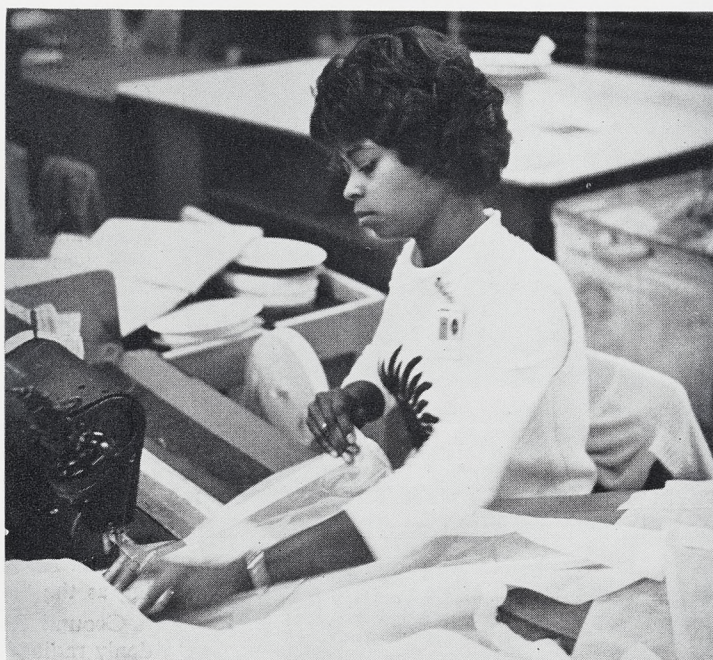
In his service with NATO he met with foreign government officials and high-ranking civilians and military officers throughout the U. S. Government. He also conferred with officials of the Supreme Headquarters—Allied Powers of Europe (SHAPE), Military Assistance Advisory Groups, and executives of some of the major industrial facilities in Europe.

A graduate of Massachusetts Institute of Technology, he holds a bachelor of science degree in business and engineering administration from that school.

If You Are Eligible for Medicare, Be Sure to Sign Up Now.



Nylon fabric for canopies of Northrop Ventura's Apollo parachute system must be laid out in layers before pieces are cut to match patterns. Nelly Cook (left) pulls material from bolts and trims it to convenient lengths before final cutting (right) begins. Sections of as many as four canopies are cut to match paper markers, which in turn duplicate original metal patterns. Below, Bobbie Taylor bastes tape into position before sewing of three-needle main seams.



3,300,000,000 STITCHES IN TIME

Space Technology Is Not Altogether a Man's World

In 400 hours of sewing on one Apollo spacecraft main parachute, Ted Szostek's crew of Northrop Ventura seamstresses can expect to complete more than 33 million stitches.

Multiply the Paralab's work by some 100 main canopies completed to date and the figure already hard to comprehend defies understanding.

Alone, these statistics, reported to Mr. Szostek, head of the Paralab, have little meaning. But connect them with the high standards of quality necessary in assembling the Apollo parachute system and they take on considerable significance.

"We have our defects down to a bare minimum," Mr. Szostek reports, "even before NASA Quality Control inspectors get a look at one of our parachutes."

Examination of the parachutes by the in-process examiners, combined with rigid Ventura Division Quality Control inspection procedures, provide American astronauts with as great a safety standard as humanly possible.

Material for the parachutes is received at the Paralab, officially designated Parachute Experimental Fabrica-

tion, in 300- to 400-yard bolts 42 inches wide. Two different fabric weights, 2.25 ounces per square yard and 1.1 ounces, are used.

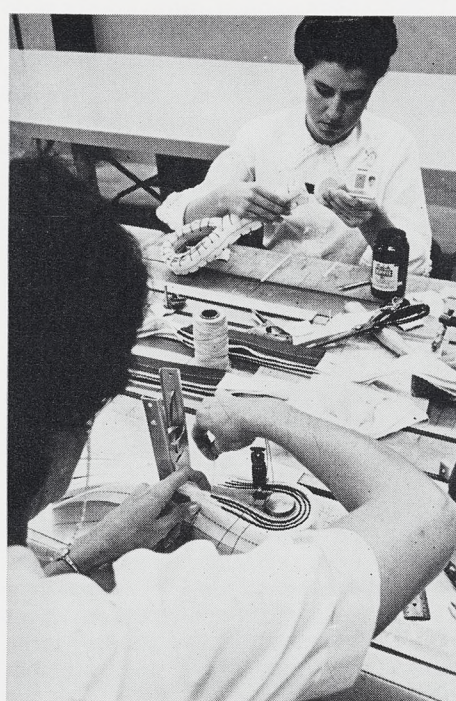
Four of the main parachutes are cut at one time. There are 68 gores to a chute, each made up of 12 sails. The canopy is reinforced with a total of 19 lateral tapes plus the vent and skirt band.

This is where all the stitching comes in. Some of the reinforcing tapes require as many as four separate rows of stitches, not including the basting necessary to hold the tapes in position on the edges of the nylon cloth for sewing.

The main parachutes are of the Ring-sail type, with the sails, or individual panels, separate from each other at top and bottom.

In portions of the main chute receiving high stress, on opening shock for example, both the leading and trailing edge of the sails are reinforced with nylon tape.

Usually 136 lays, or layers, of material are cut at one time, using paper markers matched to the master patterns.



Test samples are prepared as part of continuous effort to improve Apollo parachute system. Hilda Howard (right) whip stitches one sample while Joanne Bishop applies anti-fray solution.

One of the more difficult procedures in making a main canopy is sewing the main seams in which two 300-pound tensile strength tapes and the sail cloth are rolled into a French fell seam. Because eight thicknesses are involved, the sewing machine operator must guide the cloth and tape through by hand, with a special guide on the presser foot.

Normally, on a standard French fell seam where there are only four layers of thickness (just cloth, no tape) a folder is used on the machine. But with the tape which makes it eight layers, this is not possible.

Since the main parachute is almost 84 feet across, overhead rails and wires are used to hold the canopy in place conveniently during the work.

Main parachutes are not the only parts of the system made at the Northrop Ventura Paralab.

Drogues, pilots, retention flaps, deployment bags and nylon cord risers for all the canopies are also assembled there.

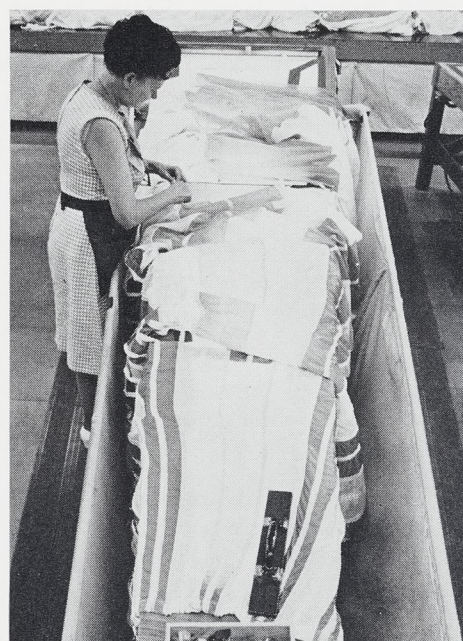
There are eight parachutes used in each Apollo parachute system, three mains, three pilots and two drogues.



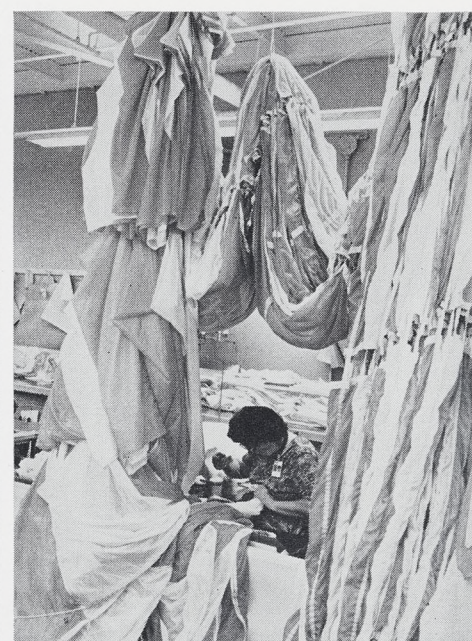
Next step after basting, three-needle seam sewing, requires two women, Celia Marquez (left) and Shirley Kennedy working as team. The two weights of material which are used are 1.1 ounces and 2.25 ounces per square yard.



Three seamstresses, from front, Celia Marquez, E. C. Parker and Darlene Shoemaker, work side by side on main seams of canopies. Edges of nylon fabric are special weave for added strength.



Seamstresses examine parachutes while they are being made, even before the formal Ventura, NASA, or North American Aviation inspections take place. Nelda Freymond checks three-needle main seam between gores of main canopy.



Overhead conveyor rails facilitate Mrs. Grace Shaw's handling of partially assembled canopy as she hand sews wraparound reinforcement on skirt for attachment of suspension lines. This is one of few items not sewn by machine.

MORE THAN \$600,000 IN IDEAS



First Northrop Data Processing suggestion originators under the Cost and Management Improvement Program receive recognition for their cost saving ideas from Paul O. Wierk (fourth from left), Corporate director, Management Information, himself an idea originator. Recipients of CMIP lapel pins, desk plaques and certificates, some not in

photo, were Ed M. Piper, Ray Turner, Jack Slack, H. D. Hunt, Loren Nelson, Glenn W. Thornton, Arthur A. Phelan, Richard T. Miller, Spencer L. Manlove and D. J. Villegas. Men work at Hawthorne, Anaheim and Ventura. Department goal for fiscal 1966 is \$1 million. Savings to date this fiscal year exceed \$600,000.

Where Outer Space Begins

In January 1963, a group of some 15 Northrop senior scientists and engineers came to Huntsville, Alabama, to establish the Huntsville department of Northrop Space Laboratories. From this modest beginning, Northrop Space Laboratories has become an active, on-the-scene participant in the aerospace industrial community in this Tennessee valley city where, as highway billboards acclaim, "Outer Space Begins."

Today, the Huntsville department employs approximately 300 people who are engaged in vital research and development functions for the U.S. Army Missile Command, NASA's George C. Marshall Space Flight Center (both located at Redstone Arsenal, Huntsville) and other elements of the aerospace industry.

General John A. Barclay (U.S. Army, ret.), manager, and Milton Beilock, assistant manager, head the management team at Huntsville. The department is divided into three functional areas: Staff, Project, and Technical. Plans and Programs and Business Administration units compose the Staff branch. The two project groups are the Lunar Drill Project and the NASA-MSFC Aero-Astrodynamic Laboratory Support Project. Functional entities in the technical area are: Research and Analysis section, Systems section, Experimental Operations section, and Cape Operations.

First home for Huntsville group was the Huntsville district office in the Holiday Office Center; later, as support requirements grew and the staff increased to 50 persons, office space was leased from Brown Engineering Company. In November 1963, the first unit of the company-owned headquarters was completed in Huntsville's sprawling Space Research Park.

The initial structure, with an attractive stone and glass exterior, contained 20,000 square feet of floor space. Expansion, which doubled the

available floor space of the original unit, was completed on Northrop's 42-acre site just before the yearend holiday.

Space Research Park, located within a few minutes drive of Redstone Arsenal and adjacent to the University of Alabama Research Institute and the University's Huntsville campus, is a 2000-acre industrial complex established in 1961 by the City of Huntsville.

Northrop's neighbors in the park-like development include IBM, Lockheed Missile and Space Company, Chrysler Corporation, Stanford Research Institute, Boeing, Dow Chemical Company, and Brown Engineering Company.

With the physical growth of the Huntsville department has come an appreciable growth in the scope and influence of its role in the aerospace activities in the Huntsville area. Support to MSFC's Aero-Astrodynamic Laboratory, which was one of Northrop's earliest relationships in the area, is continuing and it requires 56 persons located in the laboratory on Redstone Arsenal.

Currently, a large percentage of the more than 200 persons in the Huntsville department's main office are involved in the Lunar Drill Project and other important research and development studies.

More than 50 Northrop people are engaged in support efforts, through the Huntsville department, at Kennedy Space Flight Center at Cape Kennedy, Florida. Through its growth, Northrop Space Laboratories Huntsville department feels something of the pioneer's thrill as it forges into new technologies and accomplishments with all of Northrop.

One doesn't have to live in Huntsville for a lifetime to qualify as a pioneer, nor to say, "I remember when . . ." for the city itself is under-

(See HUNTSVILLE, page 5)

F-5 Training Flight Turns Into 'Real Thing' in Greece

An American general officer and a Greek pilot on a training flight in an F-5B got a taste of the real thing recently when they intercepted four unidentified aircraft over Central Greece, it was reported in the Athens Daily Post.

The aircraft turned out to be friendly — four Italian Air Force RF-84F's en route home from an exercise — but the drill was real enough to Air Force Major General Harry L. Hillyard, chief of the Military Assistance Group in Greece, and Major Nick Artinos, commander of the 343 IDF squadron of F-5 fighters.

The two officers were on a familiarization flight to acquaint General Hillyard with air defense interception under radar control. Another F-5B was acting as the "intruder."

Ground Radar Control suddenly radioed the Northrop aircraft that an actual "unknown" had appeared on his scope. Major Artinos was asked to intercept.

Greece has received its initial shipment of F-5's under terms of the Military Assistance Program, and official ceremonies are scheduled for later this year.

Mariner Work Leads To Fiction Thriller

Northrop work on the Jet Propulsion Laboratory's Ranger and Mariner programs has produced an unusual byproduct for Bill Ellern of Northrop Space Laboratories.

Mr. Ellern's document research at JPL led him to write a science fiction story entitled "Moon Prospector." It will appear as the cover story in the April issue of Analog Science Fact and Fiction.

This is the author's first work, making his batting average 100 percent so far.

A graduate in physics from Washington State University, Mr. Ellern has been at NSL for three years, two of these in support of JPL environmental systems testing for Ranger and Mariner. His current work is in sterilizable modules for a Mars landing vehicle.

SPRAY BOOTH



Overhead conveyor permits rapid preparation of drone parts by Mick Lanning in Northrop Ventura paint shop spray booth.

U.S. Savings Bond Interest Increased

Northrop participants in the U. S. Savings Bond Program will be recipients of a windfall by virtue of the recent increase in the interest rate of Series E and H U. S. Savings Bonds.

Effective December 1, 1965, Series E and H Bonds were increased to 4.15 percent from 3.75 percent. Bonds purchased since then will earn the new rate and it will also apply from that date to bonds bought earlier.

On Series E Bonds the increase will be accomplished by reducing the maturity date to seven years. Under the 3.75 percent interest rate, Series E Bonds matured in seven years, nine months. Thus, a series E Bond purchased now for \$18.75 will be worth \$25 when it matures in seven years.

On Series H Bonds, the increase will be accomplished by raising the amount of the semi-annual dividend sent by the Treasury to the bond holder. Series H Bonds are sold at par value and mature at the same value after 10 years, with interest paid meanwhile.

Application forms to participate in Northrop's U. S. Savings Bond Program can be obtained from Industrial Relations.

NEITHER SNOW, NOR RAIN, NOR HEAT, NOR GLOOM OF NIGHT . . .



While Northrop-built F-5's sweltered in humid Vietnam on one side of the world, Northrop's leased F-5B (left photo) was carrying out demonstration program on snow- and ice-covered

eastern seaboard. Snow cleared from runways is piled high as F-5 taxis out for flight at Patuxent River Naval Air Station, Maryland. Demonstration was carried out last month de-



spite "great blizzard of '66" which left F-5 only jet aircraft operating from Patuxent River, one of nation's largest jet bases. In photo at right, U.S. Navy maintenance personnel observe re-

fueling of F-5B. Highly favorable comments were received on ease of maintenance, quick turn-around time for F-5.

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

Going my way?

Rides Wanted

7 a.m. — 3:45 p.m.

Crenshaw & Torrance Blvd., Torrance. Lela Love, Norair ext. 1834, 328-7234. 2

Denker & W. 224th, Torrance. Dennis L. Brashears, Norair ext. 2236. 2

7:30 a.m. — 4:15 p.m.

Gould Ave. or 26th St. & Hermosa Ave., Hermosa Beach. Penny Prouty, Norair ext. 1458, OS 9-6520. 3

Highland & Marine, Manhattan Beach. L. Berg, Norair ext. 2763, 679-6762. 3

8 a.m. — 4:45 p.m.

Pacific Coast Hwy. & Ave. I, Redondo Bch. Connie Metcalf, Johnson Bldg. ext. 526, 378-7290. 5

Rides Offered

7 a.m. — 3:45 p.m.

Denker & W. 224th, Torrance. Dennis L. Brashears, Norair ext. 2236. 12

PEACE CORPS

(Continued from page 2)

leaves, seniority is retained but not accumulated.

WHO MAY APPLY? Any United States citizen over 18 years, provided he has no dependent children under 18. Married couples without dependents under 18 may apply if both can serve. There is no upper limit and Northrop retirees may apply.

IS ANY SPECIFIC EDUCATION REQUIRED? No, a college degree or high school diploma is not required. If accepted by the Corps, an applicant will be invited to a three to four month training course in the United States. Courses include language training, studies about nations abroad and a refresher class in American history.

WHAT IS THE PAY OR ALLOWANCES? All expenses—including travel, food, clothing, medical care, and incidentals—are paid by the Corps. Upon completion of two years service, a volunteer will receive \$1800, which is taxable, and a married couple will receive \$3600.

Employees interested in joining the Peace Corps should contact their appropriate Division Industrial Relations office before March 28. A schedule of interviews will be arranged with Peace Corps representatives and each applicant will be contacted individually as to the day and time of the interview.

For Sale

Lot, R-1, 8300 sq. ft., adjoining Santa Monica Fwy., \$14,750. West L.A., 473-1071. A

Encyclopedia Britannica w/bookcase & year-books, 1942-1961, \$175. Bellflower, TO 7-4362. A

Tape Recorder & playback sys., Sony model CS-300 stereo, carrying case, 2 microphones, \$200. L.A., AX 3-354. A

Mattress & box spring, Spring Air, 1-yr-old, headboards & metal frame incld., \$100. Inglewood, 677-5705. A

Ford Ranchero, 1958, V-8, stick, r/h, 46,000 orig. miles, \$450. Torrance, 327-0272. A

Corvair Monza, 1963, r/h, \$1195. Box 501. A

Bicycle, boy's & 2 girl's, 26", \$20. Lawndale, OS 9-0876. A

Surfboard, 9'1" Lyman, new skag, \$45. Torrance, 375-6071. A

Surfboard, 9'1", Bing, \$80. Torrance, 325-4789. A

Tires, 5 6.70x15 4-ply. nylon, 3 are new, \$45. Hawthorne, OS 6-1345. A

Sailboat, 13' sloop rigged, fiberglass hull, centerboard, Romeo class, cartop carrying rig, dacron sails, access., \$375. Torrance, FR 4-4953. A

Projector, 35mm Tower, 500 watts, extra bulb & trays, used very little, \$62.50. Sherman Oaks, ST 8-9709. A

Chevrolet Biscayne, 1961, 6-cyl., auto. trans., r/h, \$650. Inglewood, 678-1621. A

Motorcycle, 1965 BMW, 500cc, 6500 miles, dble. seat, roll bars, windshield, luggage rack, \$1050. L.A., 939-7834. A

Bicycle, 3-spd., 1-yr-old, \$15. Hawthorne, OS 6-6463. A

Arm Chairs, blonde 2 Swedish modern, high-back, wood arms, \$40 ea.; \$75. Gardena, DA 9-9195. A

Trampoline, king size, cost \$175, \$50. Downey, TO 9-2700. A

Pontiac, 1957, 2-dr. sedan, auto. trans., radio, \$200. Hawthorne, 676-4879. A

Boat, Fiberglass, 15' Tel-craft w/40 hp Evinrude motor & Tee-Nee trailer, \$1200. L.A., OR 0-6896. A

Home, 3-bdrm., forced air heat, bltins, 9 miles from Douglas A-3, \$500 dn., \$14,500. Huntington Bch., 370-8036, 323-3856. A

Olds Holiday, 1956, 75,000 miles, \$175. L.A., 755-5507. A

Corvette, 1960 h/top, r/h, w/w, \$1200. Manhattan Bch., 379-8330. A

Fairlane 500, 1959, 4-dr., 300 hp, new tires & battery, r/h, p/s, \$295. Torrance, 371-7274. A

Pickup, 1957 Ford, 3/4-ton, \$450. Manhattan Bch., 379-2649. A

Tape Player, stereo, Autostereo, chrome w/bracket, \$50. Torrance, 324-8789. A

Boat, 1963 17 1/2' Glasspar Sun Liner, 2 35 twin Merc. outdbs. less than 80 hrs. running, 2 12 gal. gas tanks, bait tanks, American trailer, seats 6, many other access., \$2500. Lakewood, TO 8-6977. A

Dining Room Set, Bassett solid walnut, table & 4 chairs, buffet & crystal cab., extends to 96" w/4 leaves, deliver up to 5 miles, \$100. Hermosa Bch., 372-6755. A

Jaguar, 1957, XK 140, new tires, brakes, body needs work, good eng., \$300. Manhattan Bch., 379-6762. A

Hi-Fi stereo comps., AM/FM tuner, dual amplifiers, preamps & cross-overs, 4 speakers, stereo turntable, \$70. Hawthorne, 676-0418. A

Stove, Kenmore, 3 yrs. old, \$50. Hawthorne, 675-0407. A

TV, 21" Packard Bell console, maple cabinet, UHF, \$100. Hawthorne, OS 5-1847. A

Home, 2-bdrm., in Westchester, lge. lot, dble. gar., near schools, shopping, 5 1/4% FHA loan, low dn., \$23,850. L.A., 645-5169. A

Rambler Ambassador 990, 1963, 4-dr., b/seats, AM/FM transistorized radio, o/drive, posi-traction rear end, p/s, p/b, \$1350. L.A., 475-1497. A

Captain's Chairs, 8 Danish teak, \$80. Westminster, 714-897-0597. A

VW, 1961, set up for slaloms, Goodyear SP's, Porsche clutch, decambered, many extras, \$850. Fullerton, 871-4263. A

Pups, German shepherd, avail. about March 27, AKC reg., \$100. Hawthorne, 676-1441. A

Metropolitan Museum Seminars in Art, 24 vols. comp. w/288 color plates on sep. sheets, suitable for framing, orig. cost \$100, \$25. P.V. Pen., FR 8-1863. A

Surfboard, 9'1", redwood stringer, \$55. FR 5-0061. A

Vacuum Cleaner, Hoover, upright, deluxe, w/attachments, 2 yrs. old, \$55. Fullerton, 529-4788. A

Falcon, 1961, 2-dr. sedan, r/h, stick shift, \$550. Gardena, DA 4-7059. A

Rifle, Springfield, custom-built, flared maple stock, scope, \$175. Hawthorne, 674-8726. A

Prinz, 1959, sedan, good mileage, \$175. Hawthorne, 675-4505. A

Sailboat, 15' Sunray w/trailer & sails, \$200. Torrance, DA 3-2144. A

Home, 3-bdrm., 1 1/4 baths, custom-built, deluxe built ins, lge. fenced rear yard, 2 miles from Northrop, \$28,000. Hawthorne, 675-8829. A

Trailer, teardrop, butane stove, ice box, 5-gal. water tank, pump sink, sleep area 48" x80", 3" foam mattress, attach. canvas sleeps 6, \$350. Inglewood, OS 6-8893. A

For Sale

Watch, Elgin Embraceable, waterproof, shock-proof, 19 jewels, in case, guarantee, \$100 value, \$40. Gardena, 327-0662. A

Range, gas, 37" Universal, white, hook-up pipes incld., \$25. Seal Bch., 430-3942. A

Ford Station Wagon, 1959, air con., all power, \$395. Westwood, GR 4-3433. A

Porsche 1600, 1959, conv., new paint, Michelin X tires, Blau Punkt radio, \$1650. P.V. Pen., 377-4268. A

Bar Stool Set, 4, maple, w/back, \$20. Redondo Bch., 372-8334. A

Chevrolet Impala, 1961, 2-dr. sport coupe, 348 eng., Power glide, p/b, p/s, r/h, safety belts, \$1195. Woodland Hills, 347-5327. A

Station Wagon, 1960, 4-dr. Falcon deluxe, r/h, luggage rack, Fordomatic, orig. owner, \$550. N. Hollywood, PO 6-3522. A

Speakers, 2 ea., 26" Hi-Fi, 8-celled., expotential horns, comp. w/driver units, freq. resp. 800-10,000 cps, impedance 16 ohms, p/rating 25 watts, \$30 ea. Redondo Bch., 379-4559. A

Dog, Weimaraner, 4-yr.-old female, good hunting dog, has papers, \$150. Gardena, DA 4-1719. A

Corvair, 1961 Lakewood station wagon, auto., r/h, \$650. Venice, EX 1-2040. A

Volkswagen Bug, 1963, sunroof, \$1150. Long Bch., 596-1280. A

Valiant, 1961, 4-dr., r/h, big 6 eng., V-200, orig. owner, 26,000 act. miles, \$750. Lawndale, 676-3050. A

Land, 40 acres, near California City airport, \$375 acre w/\$2500 dn., 10 yrs. on balance, power, water. P.V. Ests., FR 5-4742. A

Sewing Machine, portable zigzag, \$50. Torrance, DA 9-9464, DA 7-8994. A

Piano, Starr console, mahogany w/bench, \$500-\$700 value, \$300. Torrance, 323-1698. A

Trailer, Travel 15' Traveleze, sleeps 8, stove w/oven, ice box, press. water tank, brakes, cost \$1695, \$1200. Gardena, DA 4-1593. A

Stove, Western Holly, dble. oven, griddle, \$75. Torrance, 320-4475. A

Honda, 1965, 305 Scrambler, 3000 miles, \$650. Redondo Bch., 370-0157. A

Mobile Home, 35', incl. Calif. cabana, knotty pine, completely furn., \$2995. Hawthorne, OS 5-8207. A

Lot, dble. interment, at Inglewood cemetery, \$650. Inglewood, OR 2-8468. A

Playhouse, 8'x10", 6' walls, 4 French windows, Dutch door, disassembles into 6 pcs., \$85. Anaheim, PR 4-2779. A

House, 3-bdrm., lge. water cooler, kitchen w/bltins, burch cabinets, bltin TV/Hi-Fi area, raised fireplace, 500 sq. ft. playroom/workshop attached to 2 1/2 car gar., fruit trees, walking distance to shopping center, 20% dn., \$27,250. Alhambra, AT 4-5698. A

Comet, 1961, 4-dr., stick shift, \$595. Costa Mesa, 646-3725. A

Volkswagen, 1500S, 1964 sedan, low mileage, \$1675. Lynwood, 638-4954. A

Apt. House, 4-unit, Fullerton College dist., rental income \$620 mo., cash to 1st leaves \$304 mo. pymnt., \$58,500. Buena Park, TA 8-2857. A

Outbd. Engine, 5 hp Apache, \$70. Huntington Bch., 897-6992. A

Pontiac, 1963 Grand Prix, r/h, s/belts, 4 new tires, 30,700 miles, \$1995. Garden Grove, 539-6259. A

Refrigerator, Servel & stove, Kenmore, \$50 for both. Torrance, DA 5-3724. A

House, 3-bdrm., 1 1/4 baths, patio, planters, 50x150 lot, stove & refrigerator incl., Imperial Village, \$24,000. Inglewood, OS 5-6721. A

Sofa, 3-pc. sectional, med. brown w/bltin table, recently reupholstered, \$115. Hawthorne, 676-6625. A

T-Bird, 1957, orig. owner, 47,000 miles, \$1500. Eastview, TE 2-1684. A

Saddle, roping, rawhide tree, 14" seat, dble. rigged, \$55. Camarillo, 805-482-1725. A

VW sedan, 1962, sunroof, new w/w tires, r/h, new muffler, \$1100. Manhattan Bch., 379-1657. A

House, 3-bdrm., 20'x20' family rm., near schools, fwy. & Northrop, lge. fenced yard, \$23,750, Gardena, 327-2904. A

Exec. Home, 8 mos. old, 2400 sq. ft., fully carpeted, 3 bdrm. & den, 3 baths, 3 decks, split-level, in Los Angeles, near all freeways, 10% down, \$35,900. Redondo Bch., 378-7116. A

Cocktail Table, 22" x 60", oval terrazzo top, \$15. Rolling Hills Ests., FR 8-2190. A

Chevrolet SS, 1962, auto. trans., h/top, p/s, p/b, 8-cyl., \$1300. Long Bch., GA 6-6274. A

Land, 20 acres, Antelope Valley, near Willow Springs, \$2000 dn., \$525 acre. Torrance, FR 8-1026. A

Volkswagen sunroof sedan, 1966, all extras, \$1900. Inglewood, 677-4134. A

Chevrolet Nomad station wagon, 1958, p/s, p/b, r/h, auto. trans., recent valve grind, new starter, radiator, newly replaced trans., \$425. P.V. Pen., 377-7241. A

Oscilloscope, 3", comb. inst. is a Marker generator accurate to .05% & sweep frequency oscillator, Gen-O-Scope made by Simpson, cost \$575, \$175. Buena Pk., UN 3-2769. A

Surfboard, Jacobs, 10'4", \$80. Hawthorne, 675-6486. A

For Sale

Home in Running Springs, 2-bdrm., lge. living rm., fireplace, sun porch, built-ins, all elec., trees, \$15,900. Wilmington, 834-4184. A

Corvette, 1956, 4-spd. B&M Hydro, 1963 327 eng., chrome wheels, \$600. Torrance, 320-7239. A

Ford Falcon, 1962, 4-dr. station wagon, stick shift, 101 hp eng., luggage rack, orig. owner, \$850. Lancaster, TH 2-5097. A

Vacation Trailer, 1955 Dalton, 15', butane stove & light, elec. brakes, comb. ice box & elec. refrig., \$575. Long Bch., 596-7605. A

House Trailer, 18' Oasis self-contained, water heater, shower, apt-size stove, butane or elec. refrig., 2 new truck tires & wheels, sleeps 5, \$1300. Hawthorne, OS 6-9914. A

Truck Mirrors, Coronado Mod. #601, stainless steel, \$10. Gardena, OS 6-3726. A

House, no down to Vets, 3-bdrm., split-level, 1 1/2 baths, built-ins, double gar., 1 mile to ocean, \$20,000. Redondo Bch., 374-2433. A

Boat Trailer, for 12'-16' factory blt., adjust to any hull, full lights, \$50. Inglewood, OR 1-2058. A

House, 4-bdrm., family rm., 2 1/2 baths, 1-acre, horses OK, near Northrop Ventura, \$35,000. Somis, 805-482-1186. A

Travel Trailer, 18', comp. 14' cabana, shower, many extras, \$1475. Compton, NE 2-2905. A

Range, elec., coppertone, Westinghouse, 4-burner, terrace top, auto. oven, timer, \$125. Gardena, 324-0274. A

Mobile Home, 12' x 60', 2-bdrm., awning, carport, skirts & shed, take over pymnts. of \$92.50 mo. or \$5700. Torrance, 370-4101. A

T-Bird, 1956 h/top, recent o/haul, paint & tires, auto. trans., orig. owner, \$1275. Palisades, 454-2057. A

Corvette, 1963 Sting Ray, fastback, 4-spd. stick shift, spec. handling package, hvv. duty shocks, many extras, Vibrasonic AM radio, rear speakers, \$2800. Lawndale, OS 6-6818, OS 6-5425. A

Surfboard, Bing 9'9", T-band, \$65. Paramount, ME 3-2672. A

Freezer, 22 cu. ft. chest-type, \$100. Redondo Bch., 376-2068. A

Chevrolet, 1953 convt., stick shift, r/h, \$150. Torrance, 327-4585. A

Pontiac Starchief, 1955 h/top, V-8, r/h, rear speaker, 64,000 orig. miles, \$100. Gardena, 323-8429. A

Wanted to Buy

Mercury Colony Park station wagon, 1962, '63, or '64, w/air conditioning. Torrance, 324-2992. B

Attachments for Singer hand-type vacuum. Box 502. B

Dog House, used. Torrance, 323-9586. B

Gun, Colt 45 cal. 1911-A1 govt. issue, auto., top condition. Hawthorne, OS 6-6390. B

Twin Bed set, complete, spring & mattress, & 4-dwr. chest, reasonable. L.A., 750-6926. B

Rentals Offered

Apt., single, 1-bdrm., living rm., kitchen, shower, util. paid, furn., near Northrop, \$60 mo. Hawthorne, OS 5-7371. E

Studio Apt., front, 3-bdrm., 2-bath, pvt. patio, closed gar., near schools & park, children OK, \$165. Torrance, FR 5-0867. E

Duplex, 1-bdrm., furn. or partly furn., adults, extras, \$125. Hawthorne, OS 6-5464. E

Apt., 1-bdrm., unfurn., near Northrop, \$75. Hawthorne, OS 9-7123. E

Apt., 2-bdrm., gar. disp., built-in oven, \$115. Hawthorne, 679-1205. E

Apt., furn., 1-bdrm., twin or dble. beds, no pets, adults only, \$80 mo. L.A., PL 3-8538. E

Apt., 1-bdrm., unfurn., gar. 2 miles from Northrop, \$85. Hawthorne, 674-0755. E

Rentals Offered

Apt., 1-bdrm., unfurn., garb. disp., refuse & water pd., child OK, walking distance to Norair, \$97.50 mo. Hawthorne, 676-1678. E

Apt., 1-bdrm., built-ins & garb. disp., carport, trash & hot water pd., 3 min. to Norair, \$87.50 mo. Hawthorne, 679-6639. E

Duplex, 2-bdrm., w/wall heater 1 mile from Norair, close to schools, \$75 mo. Inglewood, PL 4-1611. E

Apt., delux 2-bdrm., furn., lge. pool & patio, closed gar. & storage, near El Camino, \$135. Torrance, DA 9-5986. E

Apt., lge. bachelor, furn., util. pd., 2-bdrm., unfurn., gar., 1 block from beach, \$80 & \$125-\$135. San Pedro, 831-6789. E

Apt., 1-bdrm., unfurn., near school, shopping & beach, child OK, \$100 mo. Santa Monica, 393-8164. E

Woman to share home with same, \$65. 675-4998. E

Apt., 1-bdrm. furn. & 2-bdrm. unfurn., upper, in 4-unit bldg., all elec., free wash & dry, closed gar. & sundeck, \$120 & \$140. Torrance, 370-4778. E

Vacation Cabins, Lake Gregory & Crestline, sleeps 6, \$25 weekends; \$60 week. Venice, EX 1-2040. E

House, 2-bdrm. w/attached gar., garb. disp., small yard, water & trash pd., \$110 mo. Hawthorne, 370-4494. E

Apt., 2-bdrm., stove, built-ins, \$110 mo.; bach. apt., util. pd., 2 blocks from Norair, \$90 mo. Hawthorne, OS 6-7417. E

Apt., 2-bdrm., pool, lge. patio, built-in gas kitchen, refrigerator, closed gar., \$115. Torrance, 323-1946. E

House, 1-bdrm., furn., den, sun porch, fenced, trees, water & trash pd., \$100 mo. Manhattan Bch., 372-6495. E

Apt., 2-bdrm., 1350 sq. ft., unfurn., sub. garage, pool, blt-ins, 10 mins. to Northrop, \$127.50 mo. Lawndale, 679-2117, 670-6084. E

Child Care Offered

Child Care for 2-5 yr. olds, near Northrop, reasonable rates. Gardena, DA 3-0955. G

Lost

U.S. 1 cent piece, lge., date approx. 1853 in parking lot, sentimental value only, reward. Torrance, 325-5559. J

Personals

TO all my many wonderful friends throughout Northrop, a heart full of love & thanks for the generosity, expressions of sympathy & kindness extended to me at the loss of my husband. To my personal friends who knew Mac, I know they feel as I do that he was a joy to know. Again, my deepest thanks. ANN MAC CORMACK. L

Jack Fisher Earns 25-Year Award; 16 Others Cited

Sixteen Northrop Venturans, including a veteran of 25-year standing, received service pin awards during February.

Jack Fisher, project administrator in the Design Engineering branch, received his pin and a congratulatory handshake from George Douglas, Corporate vice president and Division general manager.

Mr. Fisher began his engineering career in 1926, as mechanical designer of coal and coke ovens for the Koppers Construction Company in Pittsburgh, Pennsylvania.

He came to Northrop in February 1941, when the Corporation was still known as Northrop Aircraft, Inc. His first position with Northrop Ventura was as assistant project engineer on the XQ-4 drone and he later became project engineer on the XQ-4B.

Fifteen year pins went to John Bross, Andrew Mertus, Sarah Hudgins and Marvin Smith.

Ten year pin recipients were Edward Diamant, Carey Buhler, Lawrence Lyon, Donald Severs, Michael Antenucci, Dick Dooley and David Berson.

Juan Wilson, Don Conn, Francis Weddle and Lawrence Gootee completed their fifth year with the company.

DRILLING

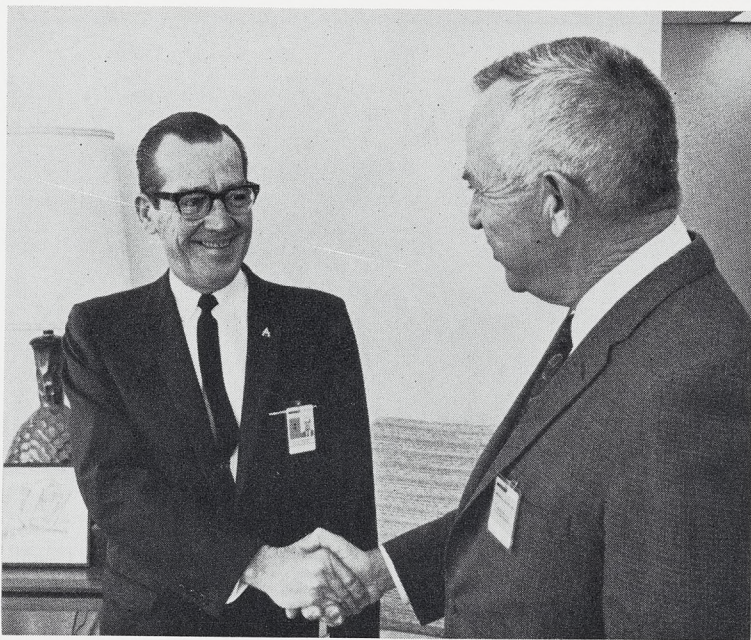
(Continued from page 1)

"The idea of moving drilling operations from the hostile surface environment was prompted by the loss of lives and more than a hundred million dollars last year alone by oil companies operating offshore drilling rigs," Mr. Danforth said.

"Oil company losses were compounded by downed production time because of hurricanes, gales and shifting foundations on numerous occasions."

Hurricane Betsy in one fell swoop wiped out three to four hundred offshore rigs, costing from six to 12 million dollars each, last year.

Distinct areas of underwater exploration and drilling have been discussed in the past, but this was the first time the systems approach has been applied to proving both the technical and economic feasibility of such a program.



THREE DIAMOND ANNIVERSARY—Chronological landmark of 25 years with Northrop earns Jack Fisher (left) congratulations from Ventura General Manager George Douglas.

APOLLO: Last Qualification Test, 009 Launch Concludes Block I

(Continued from page 1)

tion, cooperation and dedication of the people on the program."

Mr. Dale Myers, Apollo program manager at North American, in recognition of this outstanding achievement, sent the following congratulatory message to Northrop Ventura:

"I wish to personally thank you and your employees who contributed with hard work and dedication to the successful flight of Spacecraft 009 on February 26, 1966. No one person or group of persons can take full credit for such a success because it was made up of all elements of the program from the manufacture of the smallest components to the final checkout, flight and recovery. However, the contribution of each individual was evident in the results of this flight, which was a key milestone in our program."

The launch of Spacecraft 009 at Cape Kennedy shared the spotlight with the first launch of the vehicle's Saturn 1B booster and occurred in the same week that Northrop Ventura completed the series of 11 qualification drop tests of the system at the DOD Parachute Test Facility, El Centro.

Just two days before the launch of Spacecraft 009, the Apollo Earth Landing System

qualification testing was successfully completed when the eleventh and final drop test in the Block I series was conducted on February 24, 1966.

At El Centro, in a high altitude abort simulation, the Apollo boilerplate command module was released at 30,000 feet from a modified C-133A aircraft.

Drogue parachute deployment occurred at 19,000 feet. The three 83.5 foot diameter Ringsail main parachutes opened at about 10,700 feet and subsequent descent to surface landing was normal.

This last Block I qualification test followed by a month the conclusion of a series of six drops conducted by NASA at White Sands, New Mexico, to test the Apollo launch escape system. The Earth Landing System functioned successfully each time.

The eight parachutes of the system—three main chutes, three pilots, and two drogues—are destined to return Apollo astronauts gently to earth after manned missions into space.

They have been subjected to more than 100 high altitude drop tests in an extensive reliability program.

In charge of field test activities for the program is Leon Scrydloff, project engineer, Apollo Project office. Orville Reed heads Northrop Ventura's facility at the DOD Joint Parachute base in El Centro.

The Apollo program at El Centro is the logical follow-on of the Mercury and Gemini programs where Northrop Ventura served NASA in a similar role, of developing and qualifying systems for the first manned spacecraft programs.

Fred Mickey Named M-Club Executive

Fred Mickey has been appointed second vice president of the Northrop Ventura Management Club to replace Ron Waters who recently resigned because of pressing job commitments, it was announced earlier this month by Bill Young, Club president.

Mr. Mickey had been serving as a Club director, representing engineering personnel, prior to his appointment. Cal Peterson, formerly Booster chairman for the Club, was named to fill the vacancy created by Mr. Mickey's advancement.

NVRC ROUNDUP

Golfers Still Deadlocked; R&G Club Sets Schedule

Leo Riley won his tie-breaker with Bill Downs for second place in Northrop Ventura Golf Club's A Flight, only to come up with another second place tie with Bob Schaeffer. The contest was at Green Tree Inn.

Leo and Bob will battle it out at the Ojai Valley Inn Saturday, a return to the scene of Leo's first tie with Bill.

At Ojai the Ventura swingers face an Engineer's Special, otherwise known as Spring Fever Day, or a Best Ball Twosome, in which the lower score of two partners for each hole will count, no matter which partner scores it.

Trophies will be awarded to both partners of the winning twosomes.

Other scores from Green Tree were:

A Flight, Jack Carruthers, 1st. B Flight, Mike Novak, 1st; Jim Guthrie, 2nd. C Flight, Ralph Friesen, 1st; Pete Keller, 2nd. Women's Flight, Pat Gosh. Closest to pin, Cy Johnson and Al Hammons.

The longest drive of the day came off the club of Buck Gilmore, with about 310 yards from tee to green to his credit on the ninth hole.

* * *

Rod and Gun Club 1966 Schedule Set

Regular events and some special events planning of the Northrop Ventura Rod and Gun Club for the rest of 1966 has already been completed, Dorothy Prychoda, commissioner, announced.

Additional special activities for the year will be added as soon as they can be arranged, the commissioner said.

Members will participate in a shoot with the Rocketdyne club 10 a.m. March 27 at the Golden Valley Gun Club, Osborne and San Fernando Road, Pacoima.

Two deep sea fishing trips are scheduled, one on July 24 and the other August 21. A two-day outing at Lake Crowley will take the club out of town on April 30, opening day, and May 1.

A family spaghetti feed, dove hunting, a pack-in trip, and participation in openings of the inland deer season and the Utah deer season have been added to the agenda thus far.

* * *

Harry Wirth Tops Bridge Competition

Harry Wirth received recognition for the most points won in 1965 Northrop Ventura Bridge Club competition during the club's installation dinner dance and awards banquet at Los Robles Country Club.

Bob Calhoun, Jim Everett, Herm Knoeferl and Dave Hornung were honored as Team of Four champions. Tammy and Bob Tracy received an award as winners of the Autumn party tournament.

Secretaries Attend Seminar at Statler

Four secretaries from Northrop Ventura attended a two-day seminar, "The Contemporary Secretary," at the Statler-Hilton Hotel in Los Angeles last month.

Edith Dean, Jean Ozga, Betty Botwright and Joan Garfield attended the event, designed to help secretaries work more effectively as members of the management team.

FOR SAFER FREEWAYS



Morris Schechter of Northrop Ventura congratulates George Parra, winner of statewide safety poster contest sponsored by Knights of Pythias, as posters went on display at the Statler Hilton Hotel in Los Angeles recently. Mr. Schechter was California chairman of the safety campaign. Young Mr. Parra is a student at Theodore Roosevelt High School.

SWINGING INTO SPRING



Los Robles Chapter, National Secretaries Association (International), will present a fashion show with the theme "Swing Into Spring" Thursday at Monty's Los Robles Inn. Northrop Ventura's Marjie Shaw (center) helps preview show line along with Doris Warner (left) of Puroator and Margaret Snider of Packard Bell. Non-members are invited and reservations are available through Billie Linebarier or Marjie Shaw of Northrop Ventura.

NORTHROP NEWS

NORTHROP VENTURA

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COURSE LAUNCHED ON COST REDUCTION FOR 19 SUPERVISORS

Nineteen members of supervision at Northrop Ventura are participating in a cost reduction and control training course at the invitation of M. A. Maurer, vice president and manager, Production Operations.

The 19 are L. B. Carroll, M. E. Stine, H. P. McLaughlin, E. F. Hammond, R. O. Burdette, R. A. Morozowicz, M. G. Antenucci, G. H. Estes, D. O. Gilmore, G. W. Farrell, R. C. Escott, J. R. Andrews, R. G. Smith, A. F. Bartz, W. K. Burnside, J. F. Pulver, R. M. Warner, H. P. Studt and G. D. Nelson.

The self-study course is one in the PRIME (Programmed Instruction for Management Education) series published by the American Management Association.

Mr. Maurer said the 17 to 18 hour course is part of the division's continuing effort to provide supervisors with opportunities to increase their management skills and knowledge.

The 19 who are studying cost reduction were tested before they started and will be retested afterward to evaluate the course. It is the experience of other companies who have utilized this course that the supervisor's effectiveness is significantly increased.

Seven other PRIME courses have been prepared by the American Management Association and these will be made available to Ventura personnel at a later date.

Navigation System Contract Award

Northrop has received an award of \$853,000 from the Navy Bureau of Ships for a ship's inertial navigation system (SINS) to be installed aboard the USNS Twin Falls, an Eastern Test Range missile tracking ship.

This is the third navigation system which Nortronics Division has built for the range vessels, bringing the total contract up to \$2,385,000. The two previous systems are now operational aboard the USNS Vandenberg and the USNS Arnold.



NV-105 'CHRISTENING'—Winner of contest to name NV-105 target drone, John Lawrence (right) meets with runners up, R. W. Beck, J. K. Van Sickle, M. V. Silk and W. W. Raikes. Official recognition of winning suggestions, including name

"Chukar" selected by Mr. Lawrence, came from Northrop Ventura general manager, George Douglas. Ken Geller of Suggestion Award committee (left) was coordinator of contest.

Management Club Releases Schedule For Rest of 1966

Speakers for the remainder of the year before the Northrop Ventura Management Club were announced this week by Roy Murray, program chairman.

Mr. Murray said that several Management Club special events remain in the planning stage.

A complete list of the speakers and their subjects appears on page 8.

In line with the Club's theme this year of improved communications, there are 10 principles for clear writing included with the meeting schedule on page 8.

"We hope that Club members will clip out the schedule and fold it so that the principles of speech are on the reverse side. It should make a handy reference for members throughout the year," Mr. Murray said.

At next week's meeting, Ernest Loen, an authority on industrial communications, will be the featured speaker.

EDUCATION REFUND PLAN HELPS DAN CASHIER FINISH CPA WORK

With the help of the Northrop Education Refund Plan, Dan Cashier, administrator of the General Accounting group at Northrop Ventura, recently completed and passed written examinations toward attaining Certified Public Accountant status.



Mr. Cashier

In the past five years only 2967 individuals out of 16,858 who have taken the exams have passed.

Mr. Cashier took a series of refresher courses under the Education Refund Plan before completing the four-part CPA test. He studied for three years, then sat down to three separate sessions of examinations.

Before he is declared a CPA, his length and type of experience

must be evaluated.

B. W. Montag, Northrop Ventura controller, emphasized that the studies will benefit the division as well as Mr. Cashier.

"The mere fact that he took the refresher courses," he said, "will increase his knowledge in the accounting field, especially on higher levels of accountancy."

Mr. Montag said refresher courses of this type are valuable in augmenting a person's capability of reacting to problems within his area of specialization.

"These classes," he said, "can make one aware of changes and advancements in the field."

Mr. Cashier's 12 units of study took him to San Fernando Valley State College and UCLA evenings between 1963 and 1965. He was graduated from Detroit Business University in higher accountancy in 1954.

Announcing: The Chukar, A Wily Bird

Chukar is the name selected for Northrop Ventura's latest target drone, the turbojet-powered NV-105.

The name was submitted by John Lawrence, supervisor of the Mechanical and Structural Design branch, during a division-wide naming contest that started in February.

The original Chukar is a type of partridge, a wily bird that lives in the drier mountain areas of California and Nevada and gives expert hunters fits.

Mr. Lawrence's prize for suggesting the winning name is a \$100 United States savings bond.

The Chukar NV-105 drone is a variable speed, medium performance target for surface-to-air gunnery and missile system training.

Design of the 300-pound streamlined target bird will soon be completed. It will fit into the performance range between the 200-knot KD2R-5 and supersonic RP-76 drones, now in production at Ventura.

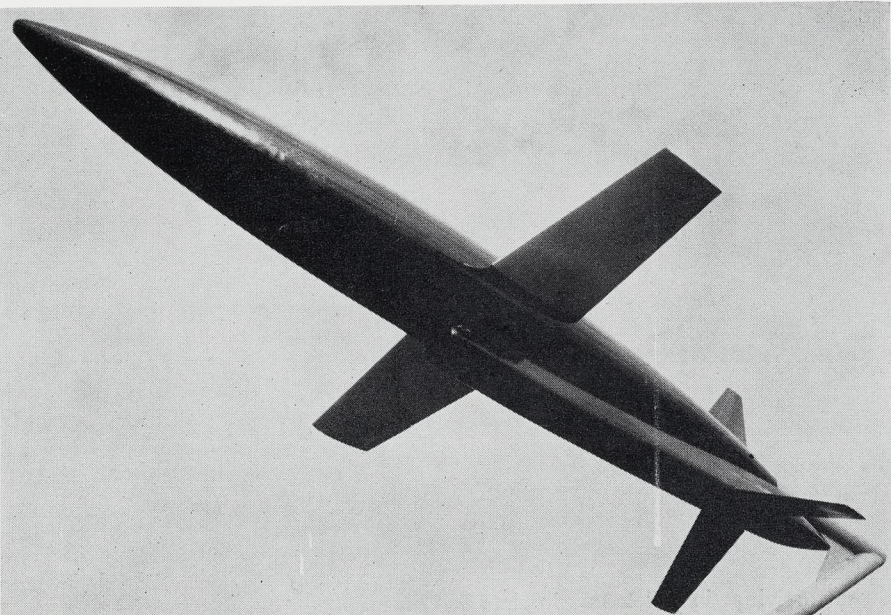
Flying at variable altitudes for about 60 minutes duration it can be used as a target by artillery, shipboard Navy and Army anti-aircraft, and low altitude missiles for target practice.

The name Chukar was selected by the Suggestion Award committee from among more than 800 names submitted. The committee, headed by Ken Geller, reviewed the suggestions with Bill Stowell, NV-105 project manager, reducing the number under consideration to 10. The final choice was made from among these by vote of division management.

The partridge for which the NV-105 is named is an elusive quarry, Mr. Lawrence reports. It is a powerful animal and strong runner.

(See CHUKAR, Page 8)

TWO CHUKARS: BOTH FITTING QUARRIES FOR EXPERT HUNSMEN



NV-105 Chukar (left) and Chukar partridge after which it was named by John Lawrence both prove elusive quarry, but for different hunters. Drone is intended to provide target practice for U.S. military guns and missiles. Original Chukar partridge holds its own against all but most expert shotgun wielders. It is rapid flier and strong runner, rarely sticks to area after being flushed once. Chukar drone is variable speed, medium performance bird, weighing 300 pounds. It will fly between 200 knots and supersonic speeds.



FRINGE BENEFITS

Benefits in Perspective: A Well Balanced Total Program



By WILLIAM LARRABEE
Vice President—Industrial Relations

I have been writing about our fringe benefit program since early last October. There are lots more interesting benefits to talk about but we may not get to them for the next few issues. I am going to be away for a few weeks beginning at the end of April and this means, of course, that there are a thousand and one things to do before that time.

Among other things, we have been working very hard with our actuaries and brokers to get out our new plan of retiree insurance and to develop a revised program for our employees and dependents over 65 years of age. All of this is necessary because the Medicare plan is getting close and we must have something which does not duplicate what Medicare provides. We will, therefore, cancel out that part of our program which involves the same protection which Medicare provides and will supplement the Medicare program with some additional coverage.

We will also have a different plan for our retirees under age 65 and their dependents under age 65. All of this takes a lot of work in order to make sure that we get the best results. It looks now as if the whole program could be published in the next issue of the Northrop News.

Just one final last minute word on this: **LET'S MAKE SURE THAT ALL OF US AND EVERYONE WE KNOW WHO IS ELIGIBLE FOR MEDICARE SIGNS UP FOR BOTH THE HOSPITAL AND DOCTOR'S COVERAGE BY MARCH 31.**

There will not be any Northrop protection for eligible people for the same things covered by Medicare after Medicare is effective. It would obviously be silly for all of us to be paying for the same thing twice.

Before leaving fringe benefits for a little while, it might be well to take a look over what I think is a basic point of the articles written so far. As I said in the very first discussion on this subject back on October 6, 1965, the value of a fringe benefit package lies in its balance and the way it satisfies the various needs of our people at Northrop. That first article pointed out that we do not require

a world's record in any event but we want a fine record across the board.

A favorite technique of someone attempting to criticize a program is to single out one outstanding item in another company, give it a big buildup and attempt to convey the impression by so doing that the grass is much greener on the other side of the street. These critics forget to mention that some other benefit may be missing or inferior at this same other company.

Without half trying anyone can find some one thing which is better at one company than at another. No one company could afford to take the top benefit from each other company and still stay in business. If a company puts out too little, it will never keep its people, and people are the foundation of a company's success. If a company puts out too much and loses its competitive position it will not need any people because it will no longer be in business.

Possibly the best thing about Northrop's program is that it is designed by Northrop people for Northrop people. Those who work on it live with it and constantly exercise their ingenuity in order to figure out ways of doing things better. We have "Northrop firsts" and some benefits that are out of the ordinary because we think ahead and because our people want them. We will always endeavor to continue with an outstanding balanced fringe benefit program for ourselves and our company.

One further thing which keeps us constantly working in our studies of fringe benefits is the fact that they change so rapidly. In the last 20 years salary and wage costs in industry have climbed by 221%. In the same period, corporate welfare and pension outlays have shot up by more than 1300%. New types of benefits show up every day. New elements are cranked into our calculations all year long.

All in all, fringe benefits are of deep concern to all of us and are a fascinating subject for study. As time goes on they will be even more important and you can be assured that your Northrop Industrial Relations people will try to be just as much out in front with their thinking as they have been in the past.

WITHHOLDING TAX CHANGES TAKE EFFECT MAY 1

A new system for withholding Federal income tax from wages will go into effect May 1, 1966. Prior to that time each Northrop employee must take certain steps to comply with the new law.

This is not a tax increase. The individual's yearend tax liability remains the same. The new system merely introduces new withholding rates which more closely approximate the rates upon which the yearend liability is based. It is, in a manner of speaking, more in line with the pay-as-you-go concept.

For instance, some Northrop employees will find the new rates are actually lower than those now in use. Others will note little difference, while still others face an increase in weekly deductions.

Early next month Northrop paymasters will distribute new Withholding Exemption Certificates (W-4 Forms) to each employee along with a government-provided document explaining the new system. Employees must complete the W-4 Form immediately.

More detailed information on the new system and how it affects each individual employee will be carried in NORTHROP NEWS, April 13.

Las Vegas Weekend On Tap April 15-17

An all-Northrop "Las Vegas Weekend" has been planned for April 15-17 by the NRC Interdivisional Travel Club.

The cost is \$32.50 and includes round trip bus fare, two nights at the Hacienda Hotel (two per room), two brunches, one buffet dinner, one show with cocktails, a champagne party and five free gaming chips.

Departure will be at 7 p.m., April 15 from Norair. Return will be at 3 p.m., April 17.

Reservations must be made by April 5 with Personnel Activities offices throughout Northrop.



Another segment of electronic engineering technology courses completed, Milo A. Thomas, development laboratory technician, (right) receives congratulations from Dick Shewmaker, his boss and supervisor of Engineering Test Laboratory at Northrop Ventura. Mr. Thomas has been studying by correspondence with Capitol Radio Engineering Institute of Washington, D.C., for some three years, with support from Northrop Education Refund Plan.

Beverly Hills NSA Has Executive Night

Beverly Hills Chapter of the National Secretaries Association (International) held its first annual executive night at the Louis D. Statham residence, Holmby Hills, with Mrs. Virginia Burkhardt of Northrop assisting in the arrangements.

Mrs. Burkhardt, secretary to Frank R. Smith, Corporate director of Industrial Relations, assisted Betty Strohm, executive secretary to Mr. Statham. Miss Strohm was chairman of the February 16 event.

The annual gathering was held as a tribute to the executives for whom the secretaries work.

April 14 Is Last Day For Voter Registration

April 14 is the final day for registering to vote in the upcoming California Primary Election.

In the interest of good citizenship, Northrop personnel are urged to exercise their individual rights by registering to vote and then casting their ballot for the issues and candidates of their choice.

IT'S 'CON COP BAY NHO'

Shrill Whine, Deafening Explosions, Oblivion for Viet Cong

It is four o'clock in the morning somewhere in the teeming jungle north of the Da Nang Air Base in the Republic of Vietnam.

Without warning, a shrill whine rents the sky and a needle-nosed aircraft streaks across the lush landscape raining death and destruction on Viet Cong hiding below.

Deafening explosions, punctuated by shrill screams and muffled curses, break the early morning silence. One by one, seven more of the tiny planes race by, each adding to the holocaust.

Now there is silence once again. But only for a moment. Across the compound a cleverly camouflaged truck roars to life and the stillness is broken by the sound of its tires crunching across the rubble of what was once an orderly military supply complex.

Skidding to a stop in front of a small wooden building that somehow managed to escape the raging inferno, it disgorges a slender young man, not more than 22 years old. He is dressed in baggy black pajamas.

His face contorted with mixture of fear and rage, the young man races into the shack, picks up a small radio trans-

EDITOR'S NOTE: Released March 12 in Saigon by the U.S. Air Force Second Air Division, this article looks at the effectiveness of Northrop F-5's in Vietnam from an unusual viewpoint—that of the enemy.



This striking photograph of four Northrop F-5's moving into formation above DaNang Air Base in South Vietnam was taken at beginning of recent strike mission with the planes fully armed.

mitter and frantically twists dials in a vain attempt to contact his superior.

In the distance the aircraft climb in a slow, lazy turn and streak back towards their objective. Dropping down to a little more than treetop height, they rip through the sky intent on but one thing — complete destruction of the buildings below.

Five hundred feet below, the frantic officer has finally reached someone. It is his advisor, located some 50 miles to the north. He barely has time to say a single phrase before a slow, twirling bomb crashes through the roof of the hut and blows him into oblivion. The single phrase he utters is "con cop bay nho."

"Con cop bay nho" — "the little winged tigers." This is the name that even the most hardbitten Viet Cong has chosen to give Air Force pilots of the 4503d Tactical Fighter Squadron and their F-5A Freedom fighters.

Capable of delivering more than three tons of death-dealing armament in a single sortie, the Freedom Fighters and their F-5A Freedom Fighters.

Since arriving in Vietnam in late

October, they have accomplished more than 2500 sorties against the Viet Cong. Comprised of 20 pilots plus maintenance support personnel, the squadron has been continuously testing the F-5A in a combat environment.

Their tests fall under project "Skoshi Tiger" — a combination of English and Japanese words meaning "Little Tiger."

The Skoshi Tigers were originally formed at Williams AFB, Arizona, last July. Although all the pilots were drawn from Tactical Air Command resources, maintenance and support personnel were drawn from a total of nine commands and 73 bases.

In addition to the men of the fighter squadron, a separate evaluation team was also formed which travels with the unit to evaluate test results.

While they have set forth impressive credentials, it is doubtful that the Air Force's Skoshi Tigers will be content to rest on their laurels.

They have fighting spirit and "esprit de corps".

Viet Cong will know the meaning of fear so long as they look up and see "con cop bay nho" — the Air Force's "little winged tigers."

C-5A MODEL PRESENTED



W. A. Pulver, president of Lockheed-Georgia Company, presents a model of the C-5A to T. V. Jones, chairman of the board and president of Northrop Corporation, at Marietta, Georgia, in commemoration of the award to Northrop Norair of the C-5A navigation system contract. Announcement of the award came last month, and work on the system is currently under way at Northrop Norair.

Space Congress Hears Plan For Flyby of Asteroid Eros

A manned flyby mission to the asteroid Eros could be of major benefit to the United States space program, Eugene A. Smith, a member of the Northrop Space Laboratories technical staff, believes.

In a paper presented during the Third Space Congress in Cocoa Beach, Florida, March 7 to 9, Mr. Smith said such a mission is feasible and within this country's capabilities.

His paper covered space missions, propulsion and vehicle systems, life support, asteroids, and pure mathematics.

"The over-all cost of the Eros mission," Mr. Smith reported, "should be well below that of other manned planetary flights because of extensive use of developments from other programs (including Apollo) and lower propulsion energy requirements than manned flights to Mars or Venus."

Eros is an irregularly shaped, elongated asteroid about 15 miles long and 5 miles wide. It will pass within 14 million miles of earth in January 1975, which by astronomical standards is very close.

A mission to the asteroid is "significantly less demanding,"

the author said, "than such interplanetary missions as Mars and Venus manned flybys.

"By 1975," he said, "a manned mission to Eros could, in addition to satisfying scientific objectives, provide invaluable experience for the more difficult manned planetary flights."

Close examination of asteroids would help explain their origin and would provide much general information concerning the solar system.

The asteroids and satellites, as well as other bodies in the solar family, are potentially valuable for exploitation. In space missions of the future, use of extraterrestrial resources, such as water and hydrogen, will become not just a possibility but an economic requirement, Mr. Smith feels.

In addition, he reported, the lesser bodies of the solar system are important components of interplanetary "weather," especially as related to manned mission hazards.

Flights beyond Mars, for example, will encounter the belt asteroids.

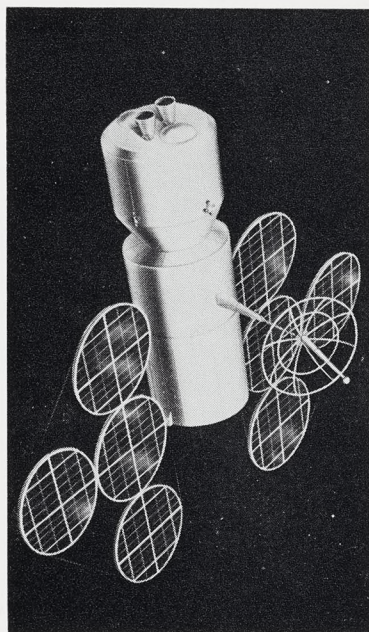
Hakes Joins NASA Reps in TV Show

One of the most comprehensive and interesting television programs viewed locally recently was the March 15 (also repeated March 18) Aerospace Briefing production called "Lifting Body Flight Test Vehicles."

John McTigue, NASA program manager; Milton Thompson, NASA chief project pilot; and Ralph Hakes, Norair M2-F2/HL-10 Project director, discussed various elements of the program. Dr. Martin L. Klein, a former Northrop employee, was moderator.

Many film clips and models used on the program were prepared at Northrop.

Station KCET (Channel 28) presented the telecast. Other Aerospace Briefing topics of interest to Northrop employees was a Gemini 7/6 program presented recently. An "Apollo Status Report" will be repeated at 7 p.m., Friday.



EROS MISSION—Manned vehicle to fly by asteroid Eros could look something like this, Eugene A. Smith believes. Circular devices are solar panels for power.

AD ASTRA PER ASPERA

Nondestructive Testing Experts Get First Glimpse of SST Challenge

By the NORTHROP NEWS Staff

Advanced developments in the wide-ranging field of nondestructive testing of industrial materials were revealed at the spring national convention of the Society for Nondestructive Testing earlier this month in Los Angeles.

Northrop Norair's Roy Wolford was chairman of the convention, which used as its theme: "Dynamic Progress through Nondestructive Testing."

Highlighting the four days of technical sessions was a luncheon address by Maynard L. Pennell, vice president and general manager of the Boeing company's SST division.

For most of the engineers and technicians in attendance it was the first glimpse of the challenges that lie ahead for them in construction of an aircraft which probably will carry 250 or more passengers and travel at 1800 miles per hour.

The first SST, which estimates say will cost \$1 billion to develop, should be airborne in 1969, Mr. Pennell said. Boeing is competing with Lockheed-California company for a government contract to build the jet.

(In anticipation of subcontract work on the SST, Norair Materials Research group began more than a year ago to perfect a new "thin film" brazing process which would enable fabrication of honeycomb sandwich structures in a new lightweight titanium alloy. The ability to honeycomb titanium promises substantial reductions in structural weight as well as increased joint strengths for the SST).

The advent of the supersonic transport era will require new developments in nondestructive testing, according to Mr. Wolford and Norair's Dan O'Halloran, national secretary of the Society.

The science of nondestructive testing embraces numerous methods for the detection and/or measurement of the performance and capabilities of materials, parts, assemblies, equipment, and structures, by tests which do not impair their serviceability.

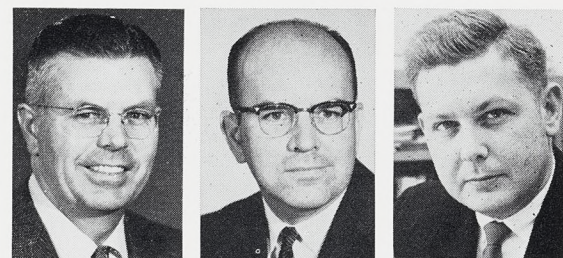
The more exotic the material used, such as titanium, the more exotic the methods for testing. Major tools used in today's testing are X-ray and isotope film, radiography, ultrasonics, magnetic particles, eddy currents penetrants, microwave and infrared.

Several Northrop members of the Society attended the convention, including Eduardo Regalado, a past chairman of the Society's Los Angeles section and recent winner of the Society's nondestructive testing president's award for outstanding officership and good section management.

Dr. Alexander Weir, jr., chairman of the Corporate council on quality and reliability, represented Northrop at the speakers' table during Mr. Pennell's talk.

PACKAGING DATA EXPERIMENT

A joint Air Force-Northrop experiment in relaxation of controls on customer review of packaging data was described by Norair Senior Engineer William J. Grinnell to the Eighth Joint Industry-Military-Government Packaging



Mr. Wolford

Mr. O'Halloran

Mr. Hallstein

and Materials Handling Symposium in Washington, D.C. earlier this month.

Packaging data forms, required by Air Force specifications, are prepared in detail and forwarded by Norair to its customers to indicate preservation and packaging procedures on most new items being furnished as spare parts.

The volume at Norair is about 175 forms a month.

Prior to the year-long experiment, each data form and its accompanying packages was placed in a hold area to await arrival of an Air Force packaging specialist.

He had to review in detail 100 percent of new forms prepared, even though some were exact duplicates as far as packaging procedures are concerned.

During the experiment all items were placed in one of four categories, each with its own review criteria. The degree of review ranged from zero percent for certain standard items to 100 percent for critical, high value, hazardous, functional items.

As it worked out, the total review for the year covered 48 out of each 100 new packaging data forms with no increase in error rate, Mr. Grinnell said.

Both the Air Force and Norair are presently evaluating the results.

Whether or not the plan is ever implemented on a broad scale, Mr. Grinnell told the symposium that use of the category system could lead to computerized data preparation at some future time.

IMPACT SURVIVAL LIMITS

Studies in impact tolerance and survival limits of man as influenced by support-restraint systems were discussed recently at an AIAA Specialist Meeting in Los Angeles by Dr. C. F. Lombard and Dr. S. H. Advani of Northrop Space Laboratories.

Basic knowledge being gained from the studies include identifying mechanisms of injuries, or just how an injury occurs. Developing out of such basic research is a technology of support and restraint systems, which could include new types of seats and restraints for crew members of spacecraft.

Dr. Lombard, head of NSL's Biodynamics Laboratory, and Dr. Advani, member of the technical staff, indicated in their presentation that "accepted impact survival limits are very conservative due to lack of improvement in support and restraint systems technology."

An interesting aspect of the studies, to the layman at least, is a concept of the human body

(See AD ASTRA, page 7)

METALLURGICAL ASPIRANTS

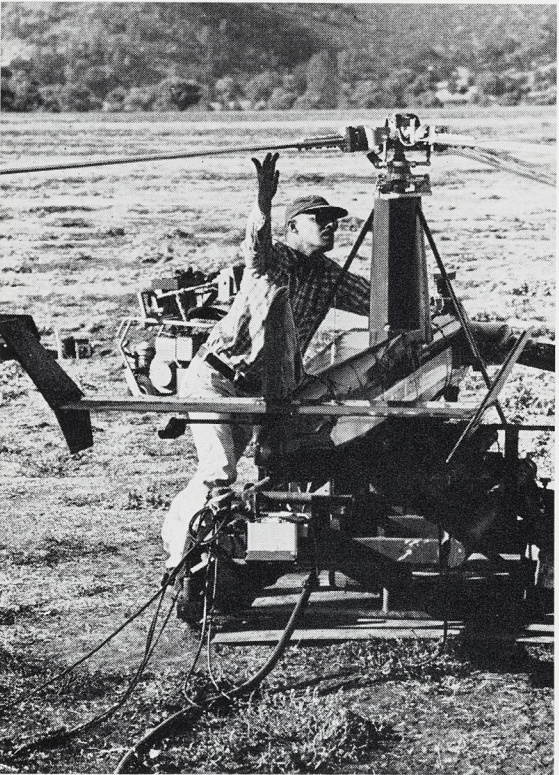
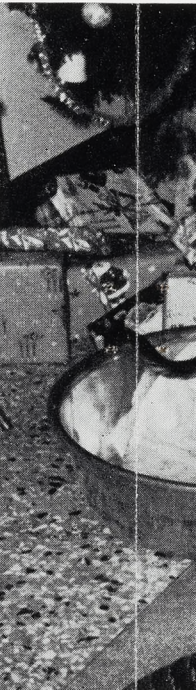
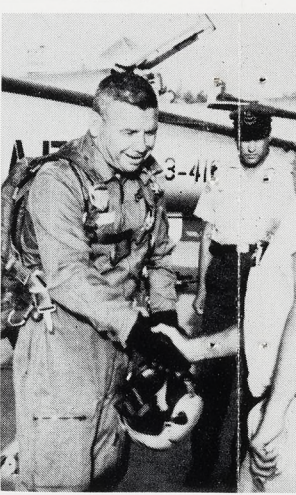


Don Bosco Technical High School's top metallurgical students, officers and members of school's chapter of Society for Nondestructive Testing, the only organization of its type in the United States, were recent visitors to Norair. They

heard key people discuss latest trends in field, toured assembly line and enjoyed lunch. Men along front rows (right and left) took part in program.



Controlling one of Northrop Ventura's drone test flights in photo (above), Jack Bean shares tense moment with Alex Krivka. Mr. Bean, one of Ventura division technical representatives, handles development flights. Others provide target services for the Army, Navy and National Guard both on continent and abroad. Instruction of military personnel on use of drones is another important function. Below, Mr. Bean checks out a developmental target and reconnaissance drone.



Desk space overseas is not always available and reports are often typed in unusual places, like Lloyd Millar's bedroom in Greece (right). Trio (below) put in long hours with "Skoshi Tiger" F-5 squadron in Vietnam and received thanks and models from F. W. Lloyd, Norair vice president and assistant general manager—Operations on return. They are, from left, C. E. Johnson, I. M. Houts and R. O. Purcell.



Norair's Jack Mann (left) wears unusual combination that causes little comment at his duty station, Turkey. Al Eldridge (above) helps Royal Hellenic Air Force maintenance men check out new equipment, while his wife, Julia (right), offers tidbit to donkey pulling ice cart, a common sight in Greece.



DEDICATED MEN SERVE

Around The World With

Dispersed around the world, wherever Northrop products are in use, is a select and dedicated group of men performing vital services for Northrop Corporation.

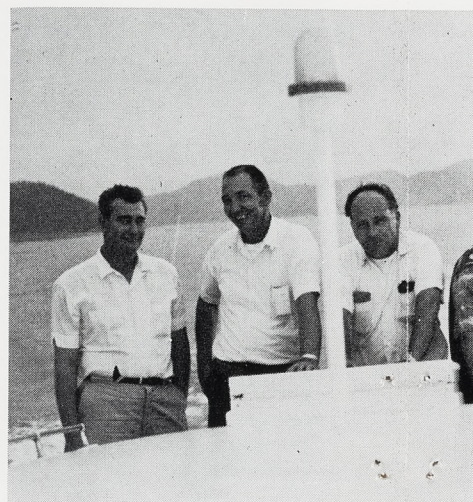
They answer to many names—service engineers, field technicians and contractor technical representatives, to name a few.

They serve in many locales—from deserts to tropics, on land and on sea, in remote outposts and thriving cities.

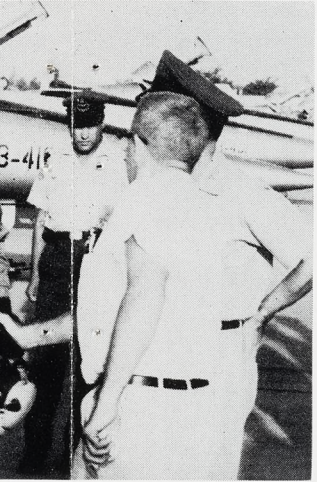
Each day they work closely with citizens of many nations, with military, governmental and civilian leaders on many levels. Their worldwide duty stations is a small indication of the diversification and extent of the many products Northrop provides throughout the free world.

Although these men represent many elements of Northrop and extensive product lines, they share a common bond. They are dedicated to seeing that Northrop customers, the users of its products, receive maximum benefits from the smallest component to the largest system.

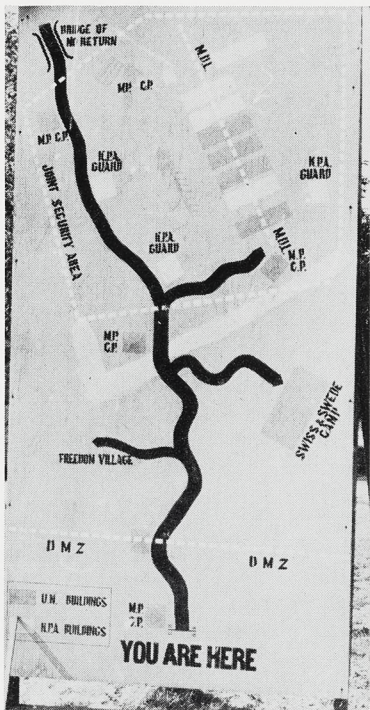
Northrop always selects its finest for field assignments for in their capability, actions and conduct the men reflect a distinct image of



Norair's Al Bardrum (photo at right) and Republic of Korea's F-5 fighter. Speeding launch (above) takes, from Erv Teare and Emerson Hofsommer of Norair, Ma Soon across waters near Republic of Korea.



Major General Harvey Jablonsky, USAF, chief of the Armish-MAAG, gets welcoming handshake from Norair's Walt Sundberg upon completing F-5 flight in Iran (left). Happiness is a warm puppy and Christmas in any land as Al Bardrum's daughter shows (below) in observing occasion in the Republic of China.



First aircraft arrival (above) at Craig Air Force Base, Alabama, prompted gathering of Colonel R. L. Ault, USAF, GE's Gordon Biggens and Norair's D. L. Marine and Ralph Quinn. Nortronics' T. E. Kelec stands beside Mare Island Navy Yard plaque near San Francisco (below). Norair representatives in the Republic of Korea snapped picture of guidepost (left) noting key point in demilitarized zone dividing North and South Korea.

ld With Northrop

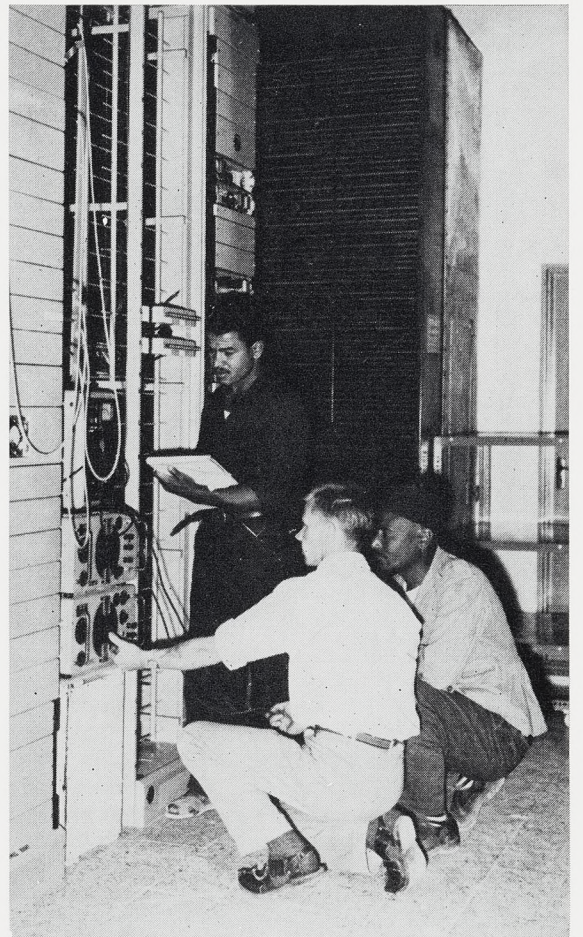
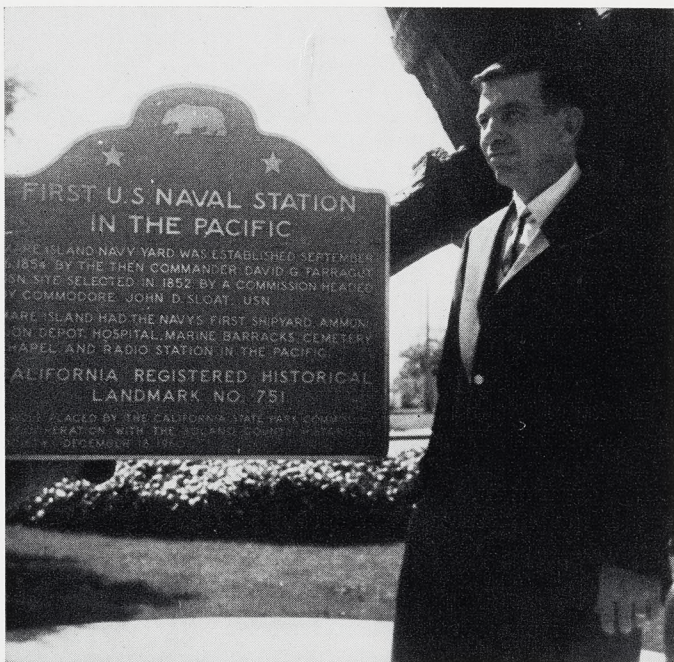
Northrop wherever they serve. Training for a specific assignment is detailed; training for field work a lengthy process. Each man is a veteran employee who has worked with his product many years. Each knows his component or system intimately enabling him to solve maintenance and supply problems quickly and effectively. And each must keep abreast of even the smallest changes.

Accepting a field assignment involves changes—in environment, living conditions, climate and diet.

Families, too, face similar changes for most field assignments are for extended periods and families accompany field men to duty stations.

Once on-site at his station, the field man automatically gears his life and actions to those he serves. He is always on call, often works long hours for extended periods in all kinds of weather and under adverse conditions.

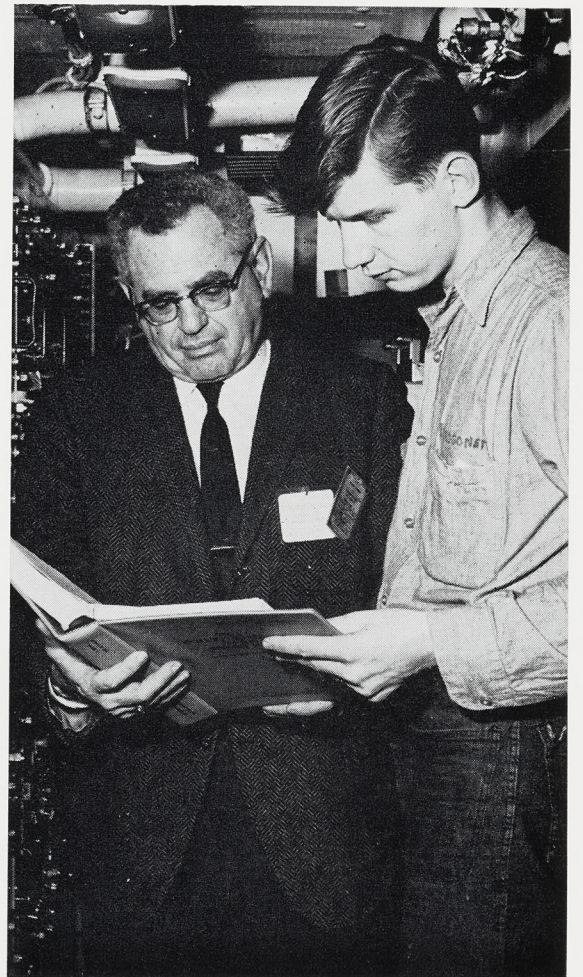
Few, if any, men who fill these jobs would change places with those at home plants for above all they like being where they are, doing what they are doing. It is a never-ending challenge.



Page Communications Engineers (above) range world installing equipment like this telephone unit being checked out in Libya. Sy Shenkman of Nortronics (below) talks over problem with Navy Polaris submarine crewman at base in Scotland.



Republic of China crewmen go over finer points (above) takes, from left, "Moose" Ramos of GE, Bob Purcell, of Norair, Major Ed Moore, USAF, and Colonel Lee Kun Korea.



NEW ON THE HUNTSVILLE SCENE



Newest addition to 2000-acre industrial complex established in 1961 by the city of Huntsville, Alabama, is this building which houses Northrop Space Laboratories' Hunts-

ville operations. The second unit to be constructed for NSL, this building doubles available floor space on Northrop's 42-acre site.

COUNTDOWN TO ZERO

16 Japanese Businessmen Attend Norair-Sponsored Symposium

Late last month, 16 members of the Japan Management Association—representing a broad spectrum of Japanese business enterprises ranging from banking, aircraft, steel, automobiles, paints and chemicals companies—were guests of Northrop for a one-day seminar dealing with the motivational approaches and implementation techniques presently being utilized in the Northrop Zero Defects Program.

Development of the ZD study team from Japan was the result of material provided them by Northrop Zero Defects Project office following a visit to Northrop by a representative of the Japan Management Association during the summer of 1965.

Upon his return to Japan, the JMA representative, Seiichi Nakajima wrote a letter to the Northrop Zero Defects Project office requesting as much information about the entire ZD Program as could be provided. The material sent to him was ultimately published in various trade journals and industrial newspapers throughout Japan.

Following a brief welcoming address by W. E. Reese of Customer Relations, and a short talk about the military implementation of Zero Defects by Major T. S. Bean of the Northrop USAF Plant Representatives' office, the morning session of the full-day seminar for the 16-man JMA ZD study team reviewed the pre- and post-ZD Day aspects of the program, stressing the motivational approaches, implementation techniques, and the sustaining methods presently being utilized throughout Northrop Norair.

At the conclusion of lunch, the JMA group toured the Plant I assembly line area and attended a comprehensive briefing (conducted by ZD council member Ed Foord in the conference room of the Product Support department) regarding the various ZD activities in which the Product Support personnel are currently taking part.

From the Product Support area, the JMA study team traveled to the Mariposa facilities of Materiel where Deputy Director M. J. Fayweather reviewed the organization's Key Quality Award program and answered questions concerning ZD activities currently being conducted.

ZD council member George Davidson served as tour guide at the Mariposa facilities to provide the JMA study team an opportunity to personally observe some of the ZD sustaining and motivational activities in actual application.

The seminar concluded in the Materiel conference room with a brief dissertation on the problems of communications delivered by L. L. (Verne) Reynolds of Industrial Relations. The next hour was devoted to a question and answer session on the various aspects of the Northrop Zero Defects Program.

The members of the JMA study group in the accompanying photograph, together with their respective business enterprises in Japan, included: Takuzo Ogawa, associate director, Planning department, Kawasaki Aircraft Company; Tadataka Matsumoto, manager, Production department, Okano Electric Wire Company; Kenji Shirai, chief, Planning section, Control & Administration department, Enshu Limited; Hiroyuki Suzuki, manager, Production Processing center, Nippon Accumulator Company, Limited; Hideo Kokubo, chief, Office Administration department, Saitama Bank; Tomoichi Kadono, assistant manager, Quality Control Division, Nippon Electric Company; Kazuo Hino, Technical section, Technical Administration department, Technical Headquarters, Mitsubishi Heavy Industries, Limited; Naoteru Naka, executive managing director, Keihan Electric Wire Company; Tsutomu Itakura, assistant manager of Industrial Engineering department, Osaka Steel Works, Sumitomo Metal Industries, Limited; Kazuo Kobayashi, assistant to chief of section, Office Systems and Procedures department, Sumitomo Metal Industries, Limited; Hideto Ouchida, chief, Business Improvement section, Daihatsu Kogyo Kabushiki Kaisha; Yaichi Yamano, chief inspector, Osaka division, Daihatsu Kogyo Kabushiki Kaisha; Kojiro Seiki, chief, Production Control section, Honny Chemicals Company, Limited; Yoshimi Ishikawa, director, Consulting and Education Division, Japan Management Association; Shigeru Maeda, editor-in-chief, Management News, Japan Management Association; and Ryuji Fukuda, product manager, International Division, Japan Management Association.



Northrop Attends NASA-Sponsored CMIP Seminar

Northrop was among 39 contractors invited to attend a NASA-industry cost reduction seminar at Dallas, Texas, last month.

Purpose of the seminar was to exchange ideas on methods of increasing the effectiveness of cost reduction efforts, according to Ken Hornor, Corporate Cost and Management Improvement Program coordinator, who represented Northrop at the seminar.

Northrop was invited to participate in the NASA program following an evaluation of the outstanding Norair Division CMIP effort for fiscal 1965. A certificate of approval of the Corporation's program, signed by NASA Administrator James E. Webb, will be forthcoming in the near future, Mr. Hornor said.

"The seminar was especially well organized and proved to be of interest and benefit to all concerned," he added.

Mr. Hornor pointed out that evidence of the high level interest in cost reduction activities is reflected in a telegram to Brooks Preacher, director of NASA's Office of Cost Reduction, from President Johnson. The President's message read, in part:

"The continued strength of this country depends upon our ability to provide for national security, to meet our international obligations, and to pursue important endeavors here at home within budget limitations that will enable us to maintain a sound and healthy economy.

"This means that we must continue to look for better and less costly ways to do the job. I intend to continue to emphasize the necessity for efficiency and economy throughout the government and in concerns that are doing business or seeking to do business with the government.

"NASA and its contractors have started a fine Cost Reduction Program. This program has already saved NASA \$200 million. I am confident that your participation in this seminar will stimulate further progress in this very important effort."



Northrop Recreation Clubs have obtained discount tickets to ride Palm Springs' famed Aerial Tramway. Tramway is shown above making its 15-minute ascent to top of Mount San Jacinto. Ride moves from desert regions below to forested, and often snow-covered, highlands.

Scarpiero Heads PR For International

Ben H. Scarpiero has been named head of Public Relations for Northrop International, it was announced this month by Norman Warren, Corporate director of Public Relations and Advertising.

Mr. Scarpiero, a retired U.S. Air Force officer, joined Northrop last August as assistant head of Public Relations at Norair.

As a public affairs officer for the Air Force, he participated in numerous operations in the U.S., Europe, Middle East and South America.

As Public Relations representative to the International Division in Beverly Hills, he will assist in coordinating promotion abroad of Northrop products, which are currently in use in more than 50 countries.

NORTHROP NEWS

Vol. 24

No. 6

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Telephone: 675-4611

HAPPY LANDING, EARL



Captain Earl E. Hallum (center) has been re-assigned as a Forward Air Controller in Korea after a long period with Northrop's Air Force Plant Representative's office. Presenting him farewell mementos are Lieutenant Colonel Rufus K. Keeling (right), AFPR, and Major Roy J. Boyd. Farewell luncheon for Captain Hallum was attended by more than 35 friends. Working out of Palmdale, Captain Hallum has been active in Zero Defects, safety and quality efforts through AFPR's Safety and Flight Operations division.

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

NORAIR WELCOMES CHURCH LEADERS OF NEARBY CITIES

Thirty - two church leaders from Hawthorne and neighboring communities were guests of Northrop Norair March 16 for the first annual observance of Norair Clergy Day.

Taking part were ministers, priests and rabbis serving churches, parishes and synagogues in the area. They heard key Norair officials discuss current and future programs, Norair personnel policies and plans and toured key areas in the plant, including assembly lines, subassembly areas and Automated Operations Control points.

Richard E. Horner, Northrop senior vice president and Norair general manager, spoke to the group. Others taking part in the program were T. L. McCarthy, manager of Administration, Walter Fellers, acting manager of Research and Development, and the Reverend John Chambers of Employee Relations.

Norair hosted the group at a luncheon and presented a special film, "Northrop 1965," as a part of the program.

Bridge Buffs Compile Library for Players

Here's something for the bridge buff — a special library composed of nothing but volumes on bridge ranging from material for beginners to advanced players.

It has been established, or rather storage arranged, in the Nortronics Anaheim Technical Information Center by the Nortronics Bridge Club.

Lyle Alexander indicates any of the 13 volumes may be checked out for a one-week period. Reservations may be made for particular volumes by contacting him at ext. 723, Anaheim.

Mr. Alexander indicated present plans call for adding further volumes to the library as NRC funds become available.

ROUND TRIP

A U.S. Savings Bond owned by a resident of Iowa was swept up by a tornado and deposited on a farm in Illinois. The finder located the owner by the name and address on the face of the bond and promptly returned it.

For Sale	
Wood Shaper, hvy. duty, 1/2 hp motor, stand, \$50. Huntington Bch., 897-6992.	A
Dining Room Table, blonde, dropleaf, 4 straight chairs, 1 arm chair, padded seats, \$75. Hawthorne, 676-6525.	A
Refrigerator, 7 cu. ft. Philco, \$15. Seal Bch., 430-3942.	A
Corvair Monza, 1963, stock & racing equip., 18,000 act. miles, \$1000. Redondo Bch., 370-0157.	A
Diamond Ring, \$50. Redondo Bch., FR 8-0994.	
Furniture, assorted, used, \$30 if all taken. Manhattan Bch., 379-6762.	A
Chevrolet, 1953, 6 cyl., std. trans., rebilt. eng., 4 new tires, \$175. Lakewood, TO 6-8977.	A
Pickup, 1/2-ton Chevrolet, 1955 w/shell camper, 1-owner, 41,000 act. miles, \$400. Hawthorne, OS 5-5695.	A
Chevrolet, 1955 Nomad, rebilt. 283 eng. w/F.I. piston, Duntov cam., chrome rims, stick Hydro, new paint, AM-FM radio, \$975. Torrance, 328-1841.	A
Triumph MC, 1964, Bonneville TTS, less than 1000 act. miles, \$800. Torrance, TE 5-8608.	A
MG-TD, 1951, \$300. Inglewood, 676-2958, 873-4841.	A
Ford station wagon, 1958, rebuilt motor, 4 new tires, \$400. L.A., 775-7827.	A
VW, 1964 sed., dark blue, \$1295. Downey, TO 9-2700.	A
Record Player, Hi-Fi, Webcor, portable, cost \$100, \$30. Gardena, DA 4-1593.	A
Surfboard, 9' Hobie, new pigment, \$50. Redondo Bch., 379-0038.	A
Piano, Fairbanks upright, mahogany, \$150. Box 601.	A
Home, in Westchester, 3-bdrm., bltin furniture, storage, beds, family & rumpus rm., landscaped rear yard w/patios & b-b-q, \$2750 dn. acceptable, \$36,750. L.A., 645-3019.	A
Seat for Honda motorcycle, \$35 value, \$15. Torrance, DA 4-8663.	A
Plymouth, 1957 2-dr. sedan, 6-cyl., std. trans., radio w/ rear speaker, heater, 40,000 miles on rebilt. 1958 eng., \$225. L.A., 752-7614.	A
Honda, 1966, 50cc, C 100, 11 actual miles. \$200. Hawthorne, 675-4505.	A
Rug, white wool, 12'x12' w/pad, \$75. L.A., 477-0610.	A
Bicycle, boy's Schwinn deluxe Sting Ray, \$45. Redondo Bch., 371-8907.	A
Buick Super, 1953, 2-dr. h/top, \$175. Hawthorne, OS 5-3866.	A
Pool Table, 8', 2 5' cue sticks, balls, rack & chalk, \$75. Torrance, DA 9-2016.	A
Chevrolet, 1959 Parkwood station wagon, r/h, Powerglide, V-8, \$495. P. V. Ests., FR 5-0867.	A
Opel station wagon, 1960, \$200. Huntington Bch., 847-0956.	A
TV, 24" RCA console, black & white, 5 yrs. old, \$50. L.A., 751-6727.	A
Plymouth Fury III, 1965, 2-dr. h/top, 426 V-8, auto. trans., full power, AM-FM radio, rec. player Vibra-sonic, tach., Sure-Grip diff., \$2495. Gardena, DA 4-6390.	A
Stove, Wedgewood, gas, white, grille, chrome top, \$50. Inglewood, 679-3879.	A
Cornet w/case, \$40. Torrance, FA 8-5931.	A
Crib & mattress, white, \$15. Manhattan Bch., FR 6-9964.	A
Drapes, 3 pair, full length, white w/avocado green, fiberglass, 3 mos. old, \$25. Torrance, 323-1400.	A
Duplexes, 2 four units, 2-bdrm., 1/2 blk. to Rolling Hills shopping center, fenced yards & patios, sep. gar., \$47,000. Hawthorne, 377-8777.	A
Karmann-Ghia, convt., 1960, 46,000 mi., good tires & paint, tonneau cover, \$795. Redondo Bch., FR 5-5204.	A
Chevrolet, 1962, Bel Aire, 2-dr., 6-cyl., r/h, auto. trans., w/s/w, \$850. L.A., EA 2-3426.	A
Sharpener, lawnmower-type, \$150. Santa Monica, 675-1042.	A
Bedroom Set, full-size ortho. mattress & spring w/frame, 5-dwr. dresser, night stand, bookcase headboard, \$85. Anaheim, 774-2779.	A
Falcon Futura, 1961, b/seats, auto. trans., r/h, new paint, \$675. Hawthorne, 679-2488.	A
Renault Dauphine, 1959, eng. & trans. rebuilt, 45 mpg, \$200. El Monte, GI 2-8888.	A
T-Bird, 1956, h/top, recent o/haul, paint & tires, auto. trans., orig. owner, \$1275. Pac. Palisades, 454-2057.	A
Dishwasher, GE deluxe, cherrywood top, \$200. Hawthorne, 679-3538.	A
Pickup, 1960 Ford 1/2-ton, long bed w/8 1/2' non-cabover camper, butane range, water, ice box & intercom., \$1200 or \$400 for camper only. Torrance, 320-3440.	A
Dining Table, rect. light mah., leaf ext. & 4 uphol. chairs, \$100. Tarzana, 343-7880.	A
Impala Super Sport, 1962, 2-dr., b/seats, 327 eng., good tires, low mileage, \$1395. Hawthorne, 676-6021.	A
Jeep, 1957, low mileage, extras, \$1800. Norwalk, 674-3603.	A
Television, Packard Bell, 17", blonde oak cabinet, \$30. Torrance, DA 3-8797.	A

For Sale	
Home, 2-bath, 3-bdrm., in Lawndale, bltins, fireplace, completely landscaped, 5% dn., \$21,900. Redondo Bch., 376-3505.	A
Honda CB77, 1964, 305cc, drag pipes opt., hvy. duty clutch, elec. starter, \$425. Westminster, 714-892-3807.	A
Ford, 1957, 2-dr., good eng., new paint, \$275. Playa del Rey, 391-8072.	A
Sabre Saw, Weller, \$10. San Pedro, TE 1-6462.	A
Cadillac, 1953, r/h, p/s, air cond., new bat., good tires, \$125. Alhambra, AT 4-5698.	A
Dining Table & 4 chairs, maple, \$50. Hawthorne, 675-7381.	A
Home, 3-bdrm., 1 1/2 baths, bltins, newly decorated, 10% down, in Holly Park, \$23,950. Playa del Rey, 823-2788.	A
Quarterhorse, sorrel, goeod roper, gentle, \$375. Tarzana, 344-1103.	A
Bar, half-round circle, brass rail, 4-cushioned stools, aqua, cost \$270; \$100. Culver City, VE 7-2942.	A
Mimeograph Machine, Niagara, \$15. Lawndale, OS 9-0876.	A
Console Table, 38"x20", converts to card table or 90" dining table, walnut. \$45. Lomita, 547-2716.	A
Engagement & wedding ring, cost \$700, \$350. Hawthorne, 679-2456.	A
Sailboat, R-11 w/American trailer, dacron sails, paddles & life jackets, \$425. Torrance, DA 3-1026.	A
Bow, Ben Pierson, 60", 35-lb., & cover, \$30. Hawthorne, OS 6-3886.	A
Enlarger, Durst R305 w/lens, \$25. Manhattan Bch., FR 9-7775.	A
Mountain Cabin & 5 lots, near church, sewers, Crestline, \$14,000. Lomita, 322-2773.	A
Sewing Machine, never used, Morris Photomatic III, retails for \$310, \$160. Westminster, 714-531-4278.	A
MGTD classic, 1950, excel. mechanical cond., paint & uphol. good, \$900. L.A., GR 2-2368.	A
Sunbeam Alpine, 1962, 1-owner, r/h, w/s/w, tonneau, \$850. Santa Ana, 714-838-4903.	A
Steel Guitar, Magnatone, cost \$200, \$50. Redondo Bch., 376-2068.	A
Sewing Machine, Mont. Ward, portable, \$20. Long Bch., GA 3-1363.	A
Studebaker Champ., 1954 spt. coupe, 6-cyl., o/drive, new int., \$200. Anaheim, PR 4-7138.	A
Exercycle, used 1 year, \$100. Hawthorne, OS 5-2772.	A
Movie Camera, Ricoh 8mm, auto. or manual zoom lens, battery drive, spool loading, elec. eye, orig. cost \$179, \$60. Lakewood, ME 3-6346.	A
Tire, U.S. Royal, 6.50x13, narrow w/w, mounted on wheel, \$5. Lawndale, 371-6775.	A
Range, elec., 2 ovens, auto. controls, 42" Kenmore, \$85. Manhattan Bch., 372-4907.	A
MGA, 1958, best offer & take over \$50 pymnts., \$565 bal. Playa del Rey, 398-1458.	A
Carpet, 6'x4' Nen Persian, Kashan, red w/floral design, \$200. Hawthorne, OS 6-9175.	A
House, low or no down. 3-bdrm., 1 1/2 bath, bltins, dble. gar., 1 mile from ocean, small yard, \$20,000. Redondo Bch., 374-2433.	A
MG roadster, 1962, 1600 Mark II, r/h, \$1200. Port. Bend, 377-8444.	A
Runabout, 16', trailer w/75 hp Scott outboard, \$1200. Inglewood, 677-2600.	A
Golf Clubs, complete set Pro-line irons & woods, 1965 model Shakespeare glass shafts, used 2 mos., \$140. Hawthorne, OS 6-8997.	A
Recliner Chair w/vibrator, white Naugahyde, orig. cost \$150; \$40. Hawthorne, 675-5654.	A
Humber, 1960 recently o/hailed, \$750. Fullerton, 528-6914.	A
Phonograph, portable, American-made, 3-sp., \$9.90. Hawthorne, 676-0418.	A
Triumph, TR-3, 1959, \$750. Garden Grove, 714-897-7626.	A
Coffee Table w/2 end tables, maple, \$25. L.A., 645-5516.	A
Chevrolet Nomad station wagon, 1958, p/s, p/b, r/h, auto. trans., recent valve grind, new starter & radiator, newly replaced trans., \$375. P. V. Pen., 377-7241.	A
Fishing Outfit, Truline Dynamo, 15-thread, full roller guided pole, Penn Senator 9/0 reel, \$55. Redondo Bch., FR 5-5760.	A
Table Saw, Craftsman 10", 2 new exts., 2 extra blades, 1 hp ball bearing motor, on stand, \$125. Inglewood, OR 7-8868.	A
Chevrolet Impala, 1964 Super-Sport, b/seats, r/h, new w/w tires, p/s, p/b, auto. trans., 327 cu. in. 250 hp eng., \$2195. Ontario, 714-984-4660.	A
Range, elec. Westinghouse, coppertone, 4-burner, auto. oven & timer, 1 1/2 yrs. old, \$100. Gardena, 324-0274.	A
Trombone, Buescher Grand, \$70. P. V. Pen., 377-3806.	A
Organ, Baldwin model 40 Orga-Sonic w/percussion, Philippine mahogany w/matching bench, 2 keyboards plus 1 octave of bass pedals, \$675. Redondo Bch., FR 5-3914.	A
Range, gas, Gaffers & Sattler, 30" shaded coppertone, avail. after May 1, \$75. Inglewood, 672-2810.	A
Surfboard, 9', Lyman & trailer, \$45. Torrance, 375-6071.	A
Stove, Hotpoint elec. deluxe model, full size, clock & cooking timer, white, \$35. Torrance, 326-4944.	A

For Sale	
Dodge Dart, 1965, auto. trans., new tires, \$1500. Torrance, 328-7369.	A
Honda, 1965 Dream 300, saddle bags, windshield, rack, radio, \$450. Torrance, 324-9118.	A
Apt. Bldg., 9 dlx. units, 3-bdrm. owner's unit, \$12,500 yearly gross, in No. Inglewood, \$105,000. Torrance, 325-9832.	A
Range, gas, 4-burner, oven, storage space, white enamel, 36" wide, \$50. L.A., 645-5090.	A
Outboard Motor, 7 1/2 hp Fishing Scott, used very little, \$100. Box 602.	A
Pencil Drawings, Western Ghost Town, 8 originals framed to stand or hang, 9x12", \$5 ea. P.V. Pen., FR 8-1863.	A
Volkswagen, 1958 new clutch & brakes, \$550. 931-6937.	A
Dinette Set, 5-pc., blonde oak, \$25. Hawthorne, 676-3651.	A
Refrigerator, Fridigidaire w/freezer compartment, \$75. El Segundo, 322-6655.	A
Ford station wagon, 1959, air cond. all power, \$375. L.A., GR 4-3433.	A
Chevrolet, 1957, 2-dr. sed. 6-cyl, stick, r/h, \$350. Torrance, 327-3538.	A
Table Saw, tilting table, 7" blade, 1/2 hp motor, \$60. Torrance, 371-5229.	A
Refrigerator, 10 cu. ft. G.E., 60 lb. freezer & revolving shelves, \$60. Torrance, 324-2992.	A
MGTD, 1950, tires & paint 1-yr.-old, \$250. Hawthorne, OS 5-5522.	A
Ford V-8, station wagon, 1955, country sedan, radio, orig. owner, \$125. P.V. Pen., FR 7-5853.	A
TR-4, 1963, o/drive, new tires, \$1750. Fullerton, 871-5617.	A

Wanted to Buy	
Coffee Table, walnut or mahogany, vacuum cleaner, preferably a Kirby. Wilmington, TE 5-9070.	B
Plymouth or Dodge, 1949 or 1950, 4-dr. sedan. Torrance, 375-0449.	B
Sailing Dinghy, fiberglass, from 8' to 12'. Box 603.	B

FREE (To Be Given Away)	
Kittens, 1 tabby & 3 white, 2 wks. old March 19. Manhattan Bch., FR 2-2287.	D

Rentals Offered	
Apt, delux 2-bdrm., furn., lge. pool & patio, closed gar. & storage, near El Camino, \$135. Torrance, DA 9-5986.	E
Apt, furn, 1-bdrm., \$110. Manhattan Bch., FR 4-0750.	E
Apt, 1-bdrm., lge. furn., incl. utilities & heated pool, \$125 mo. Hawthorne, 644-1700, OS 9-7123.	E
Home, 4-bdrm., 3 bath, fam. rm., covered patios, city & ocean view, avail. July 1, \$425 mo. P.V. Pen., 377-4268.	E
Apt, furn. single, 1 blk. from Norair, util. incld., \$90. Hawthorne, 675-8170.	E
Apt, 2-bdrm. & den, unfurn., newly decorated, in Inglewood, \$120. Redondo Bch., FR 4-1852, PL 8-5572.	E
Apt, 1-bdrm., unfurn. or single furn., bltins, refrigerator & air cond., 20 min. to Norair, \$92.50 mo. West L.A., 391-7781.	E
House, 4-bdrm., family & dining rooms, lge. yard, Rolling Hills area, \$375 incl. water. P.V. Pen., 377-8731.	E
Apt, 2-bdrm., unfurn., gar., singles furn., util. pd., redecorated, 1 blk. from beach, \$80 & \$125 mo. San Pedro, 831-6789.	E
House, 2-bdrm., gar., bltins, hardwood floors, water & trash pd., \$100 mo. Hawthorne, OS 9-7909.	E
Apt, 1-bdrm., furn., 1/2 block to ocean, closed gar., adults, \$130 mo. Redondo Bch., FR 8-7905.	E

AD ASTRA PER ASPERA

(Continued from page 3)
as a semi-fluid mass rather than a bony structure. Since most of the stress of blastoff, deceleration and "dry" landings of the future will be inertial, it is possible that blood-flow alterations and damage to the central nervous system would be more probable than broken bones.

One phase of the NSL studies is under contract to NASA to establish emergency impact limits for Project Apollo.

Basic data obtained from the research could also be applied to such pressing everyday problems as automobile safety, Dr. Lombard said.

HALLSTEIN CHAIRS SEMINAR
Frank Hallstein, Northrop Ventura engineer, will be chairman of a Thermodynamics seminar April 13 at San Diego, during the 12th annual Institute of Environmental Sciences meeting and exposition.
E. W. Bentilla of Northrop Space Laboratories is co-author of a paper with T. C. Bannister, NASA contract monitor at Marshall Space Flight Center, Huntsville, Alabama.
Title of the Bentilla-Bannister paper, which is

part of the Thermodynamics session, is "A Research and Development Study on Space Thermal Control by Use of Fusible Materials."

It deals with the use of paraffin and its heat absorption capability for temperature control in space.

AND IN CONCLUSION

F. K. Oshiro, of Electronics Systems, recently gave a presentation in Bedford, Massachusetts, to the First Symposium on Ground Identification of Satellites, sponsored by the DOD's Advanced Research Projects Agency.

Three Northrop papers were given at technical sessions of the 1966 Western Metal and Tool Exposition and Conference March 7-10 in Los Angeles. David R. Apodaca, senior engineer, and A. J. Iler, casting consultant, of Norair discussed the use of high strength premium quality castings. Bernerd Gaiennie, Manufacturing R&D administrator, spoke on recent advances in brazing structural assemblies. A. F. Eskelin, senior engineer in Manufacturing R&D discussed application of machinability data on the production of modern aerospace parts.

CLIP IT, FOLD IT, STAPLE IT, MUTILATE IT, BUT DON'T LOSE IT

NORTHROP VENTURA MANAGEMENT CLUB
Dinner Meeting Schedule

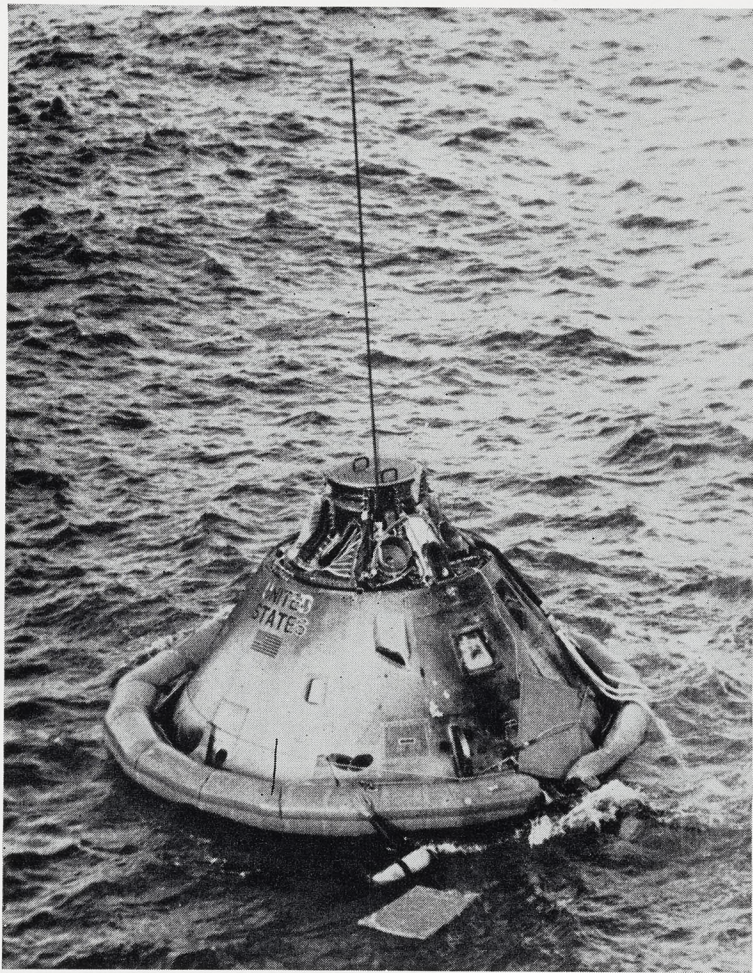
Time	Date	Speaker	Subject	Location
5:00 p.m.	6 Apr.	Ernest Loen	Communications, What Is It All About?	Los Robles Inn Thousand Oaks
5:30 p.m.	4 May	Max Skousen	Care and Feeding of the Grapevine	To be announced
5:00 p.m.	1 June	Ray Stanish	Giant Nincompoops	Los Robles Inn Thousand Oaks
5:00 p.m.	7 Sept.	Dr. Warren Schmidt	Role of Perception in Communications	Los Robles Inn Thousand Oaks
6:00 p.m.	5 Oct.	Dr. Kenneth McFarland	Leadership that Leads	To be announced
7:00 p.m.	3 Dec.	Carroll Wax & Orchestra	Dinner Dance	Las Posas Country Club—Camarillo

TEN PRINCIPLES FOR CLEAR WRITING

(Set forth by Rayburn Watkins, formerly on Staff University of Illinois School of Communications, in the Army Information Digest February 1966)

1. Keep sentences short
2. Choose the simple, not the complex
3. Use the familiar word
4. Avoid unnecessary words
5. Put action in your words
6. Write as you talk—but keep in mind that writing is for the eye and hearing is for the ear.
7. Use terms your readers can picture
8. Consider your reader's experience
9. Use variety
10. Write to EXpress — not to IMpress

WHERE THE CHUTES WERE



Empty drogue mortar can and an equally empty main parachute restraining bag are clearly visible on Apollo Spacecraft 009 as it rests in the Atlantic Ocean following its suborbital flight from Cape Kennedy on February 26. Photo was taken as frogmen place flotation collar around Apollo command module preparatory to taking it aboard the recovery vessel, U.S.S. Boxer. First Apollo flight was termed highly successful with only minor difficulties encountered.

NVRC ROUNDUP

Rockhounds Test Sealegs; Boaters Get Out Picks

Rockhounds at Northrop Ventura will get to areas that are accessible only by boat, and boaters will learn how to find and identify rocks during a combined outing of the Rockhound and Boat clubs at Havasu Lake, April 23 and 24.

The club members will camp at Havasu Landing at the lake due east of Los Angeles on the California-Arizona border.

Commissioners Art Smith of the rockhounds and Jim Sevik of the boaters declared themselves and fellow club members enthusiastic about the exchange of information.

The lapidary hobbyists will learn boat handling and safety. Boaters will be given the opportunity at a later date to study the cutting and polishing of rock they have collected at the rockhounds' lapidary shop, 18146 Sherman Way, Reseda.

Third Tie in Row Develops on Links

The third tie of the season in Northrop Ventura's Golf Club

will be played off at Thousand and One Ranch, Riverside, April 9, with the father and son team of Phil and Ron Chase taking on Dick Warner and John Carruthers.

Matching scores of 58 with handicap for first place were tallied by the four during the Best Ball Twosome event March 19 at Ojai Valley Inn.

Previous ties were between Bill Downs and Leo Riley, then between Leo and Bob Schaeffer both for second place in A Flight.

Bob currently holds the second place A Flight honors, having topped Leo at Ojai.

Third place during the partner's low score contest was captured by George Brundage and Joe Katona with 60. Competition was not divided into flights for the novelty event.

Closest to the hole on the tee shot and two selected short holes were Ed Kepka, Dick Davis and Joe Katona.

Golf Club treasurer, Dick Kipp, said perfect golf weather at Ojai brought out 70 members.

MAC FINISHES JOB

The Rest of the Recovery Story

While the flight of Gemini 8 on March 16 lasted only 10 hours and 42 minutes, it culminated hundreds of thousands of hours of advance preparations. And even then, the job just began.

As soon as the Gemini-Titan rocket left its Cape Kennedy launch pad, a team of highly specialized support personnel went into action. Playing a major role in Gemini 8 support — as it has for every other manned spacecraft flight — was the Military Airlift Command.

In addition to airlift support, each of MAC's technical subcommands — Aerospace Rescue and Recovery Service (ARRS), Air Weather Service (AWS), and Aerospace Audio-Visual Service (AAVS) — played a key role in support of the latest of the Gemini series.

The astronaut recovery operation — always an exciting space shot finale — was augmented by 400 rescuemen and 27 aircraft deployed around the world. Even though Gemini 8 made an unscheduled landing in a remote area, ARRS was there in a short time.

Rescue aircraft includes the new, specially equipped HC-130 and the HC-97 and HC-54 in the fixed wing category. The new Sikorsky CH-3C helicopter stands by at Patrick AFB, Florida, in case the launch aborts and the astronauts eject at liftoff.

Some 57 pararescuemen, all trained parachutists and scuba divers, are aboard the rescue aircraft. Each aircraft contains a Gemini flotation collar to secure the capsule following splashdown.

ARRS teams are stationed at Bermuda, Senegal, Peru, Samoa,

Australia, Singapore, Hawaii and a half dozen other sites.

When the capsule lands in or near the primary recovery area, air rescue men assist a Navy task force in recovery.

Air Weather Service has the urgent responsibility of monitoring weather data and locating possible disturbances in both the primary and alternate splashdown areas. WC-130 aircraft are stationed in both the Atlantic and Pacific for this job. When required by the National Aeronautics and Space Administration (NASA), a WB-47 weather jet conducts a cloud height verification experiment on the third day of the mission.

MAC's man on the mission support weather team is Lt. Colonel James M. Dunn, of the 6th Weather Wing, Andrews AFB, Maryland. As the National Range Division Staff Meteorologist, Colonel Dunn acts as meteorological assistant to the Department of Defense Manager for Manned Space Flight, who directs all DOD weather resources for the mission.

Photo documentation of the actual rescue and recovery is the responsibility of MAC's Aerospace Audio-Visual Service. Nineteen cameramen are spotted throughout the world to record the recovery of the astronauts and capsule.

Jumping off points for MAC cameramen include Kano, Nigeria; Perth and Townsville, Australia; Singapore, Aden Okinawa,

Hawaii and Pago Pago, American Samoa.

MAC's support of Gemini 8 began months ago when a C-124 from the 63d Military Airlift Wing, Hunter AFB, Georgia, airlifted the two-man space capsule from the McDonnell Aircraft Corporation plant in St. Louis to the launch site. The command's air transports also deploy the men and equipment to the globe-circling support stations.

CHUKAR

(Continued from page 1)

"Flush them the first time and miss," he said, "and you'll never see them again. Unlike most other game birds, they leave the area."

The original habitat of the Chukar partridge was southeastern Europe and most of southern Asia. It was introduced to California in 1932.

About 3½ times the size of a valley quail, it has a massive breast and resembles a very large quail without a crest. It has black and white barred sides and a white throat outlined by a black bar. The back is brownish grey and the tail reddish or red-yellow when spread. The bill and legs of the adult are bright red.

Both Chukar and pheasant are hunted occasionally by the Northrop Ventura Rod and Gun Club, of which Mr. Lawrence is a member.



INVITATION TO STUDY—M. A. Maurer, vice president and manager, Production Operations, provides orientation for those in supervision who will take cost reduction and control course.

Seated at side of room are Johnny Via, personnel representative (left) and Rex Fairless, director of Industrial Relations.

NORTHROP NEWS

NORTHROP VENTURA

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April 13, 1966

DON WYLIE LOGS 25TH YEAR; PINS PRESENTED TO 15

Another Northrop Ventura employee has logged his 25th year with Northrop Corporation. Don Wylie, a manufacturing engineer in Engineering Fabrication,



Mr. Lawrence

received his service pin from George Douglas, Division general manager.

Mr. Wylie came to Ventura from Norair in 1956, and soon started work on tooling methods for drones, including the RP-76 and Q4B.

(Photo on page 8)

He also worked on manufacturing engineering for Apollo hardware and for the NV-105 drone early in the program.

John Lawrence, supervisor of the Mechanical and Structural Design branch and former president of the Northrop Ventura Recreation Club, completed 20 years.

Fifteen-year awards went to Lloyd Wetzell, Walter Sternadel, Clarence Tacquard, Robert Keefler, DuPre Powell and Marie Bartz.

Completing 10 years were Dennis Sherwin, Claude Berry, Virginia Murphy, Susan Saulsberry and Thomas Labonte.

Northrop Supporting JPL Mariner Effort

Northrop Space Laboratories will again provide on-site engineering services for NASA's Jet Propulsion Laboratory. Efforts under this latest JPL contract to Northrop, awarded February 15, will be performed under the direction of A. T. Kidd, JPL/Pasadena Operations program manager.

Mr. Kidd reports directly to Louis H. Brennwald, manager of NSL's newly formed Northrop Support Operations department. As recently as September 1965, Northrop personnel were involved in the Mariner flight to Mars. From 1963 to 1965, the company was part of the Ranger lunar investigation program.

SPACE, THAT IS

Adults Can't Take It, But Kids Love It

Anyone shocked by the flood of complaints sent the major television networks recently when they interrupted "Batman" and other programs to cover the emergency landing of Gemini 8 can take hope from the interest in the space program displayed by elementary school and older students.

Some handprinted, some typed, and some both written and typed, letters from youngsters around the world arrive at Northrop Ventura regularly. All request knowledge of the space program and the Division's major contribution—the parachute landing system.

According to Henry Still, head of Public Relations at the Division, no reasonable letter or request goes unanswered.

"The youngsters showing the greatest interest," Mr. Still said, "are our engineers, scientists and business leaders of the future."

From Ann Arbor, Michigan, came the following letter, and the boy who sent it, evidently quite young, received photographs and information dealing with the Apollo, Gemini and Mercury manned space programs.

"Dear Sirs,
"I would like it very much if you would send me some information on space free. I am very

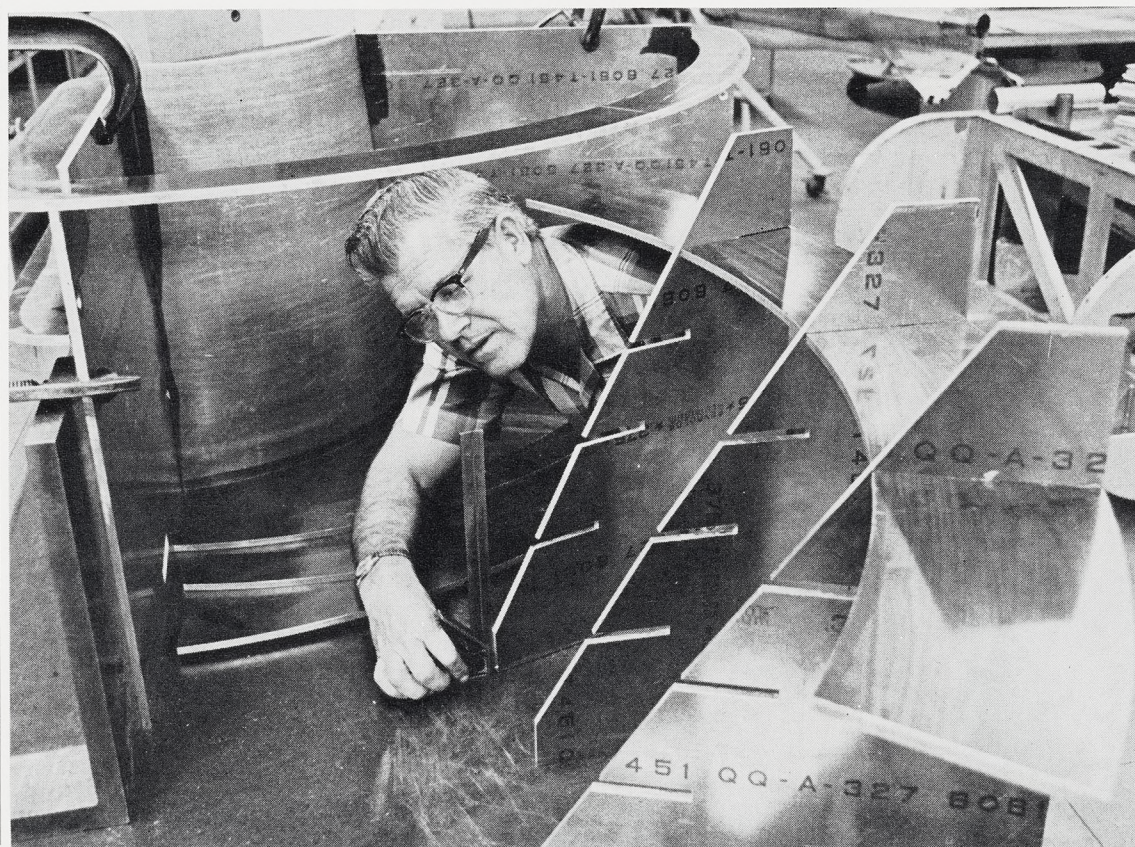
interested in space and I want some information on space that I can put in my collection of information on space. I would like color pictures but if you don't have any pictures I would like booklets . . . If you don't have any of these I would like anything on space free."

Other children, older and more capable of comprehending the details, received additional material for classwork or their private collections.

One boy in Middleton, Ohio, received "an extra copie of each thing you send me for my sister's space scrapbook."

(See LETTERS, page 8)

MODEL SHOP PEEK-A-BOO



Preparation for packing of Block II Apollo main parachutes includes two new configurations of packing boxes. Steve

J. Wrubel of Northrop Ventura model shop checks dimensions of parts which will become packing can prototype.

F-5'S IN VIETNAM TO REMAIN, JOIN COMMANDO WING

The Air Force F-5 Freedom Fighter Squadron, temporarily in Vietnam for test purposes, will be retained on permanent assignment, it was announced at Northrop News press time by Lieutenant General Joseph H. Moore, Air Force commander in Vietnam.

General Moore said that the provisional squadron would be redesignated the 10th Fighter Commando Squadron and be assigned to the 14th Air Commando Wing.

He said the new unit will be given additional aircraft and will be stationed at the Bien Hoa Air Base. This was the first official announcement by the Air Force that additional F-5's will be ordered.

Many pilots and mechanics who came to Vietnam with the 4503d Tactical Fighter Squadron for Project Skoshi Tiger have volunteered to remain with the permanent unit.

Unique Sled 'Pulls Strings', Records Data on Cloverleaf

Periodically, a cloverleaf-shaped parachute drifts toward the ground at the Defense Department Test Facility, El Centro, banking purposefully first in one direction, then the other, as it approaches the ground.

The purposeful movement of this steerable Northrop Ventura parachute system is provided by radio control from the ground, through a unique test vehicle designed by Dick Kipp in mid-1963.

Pieces of many Ventura capabilities fit into the sled-like vehicle that not only records information on the parachute's performance, but "pulls the strings" that guide the system in its flight patterns.

Signals are sent to the test vehicle by means of the same radio control system used in the Division's successful series of target and reconnaissance drones.

"With the test vehicle attached

to our steerables," the project engineer said, "we can fly them like a plane and record information on the same parameters we would record if they were fixed-wing aircraft."

The latest method of maneuvering the steerable systems includes "tip steering" in which the sides of the two trailing lobes on the cloverleaf shaped canopy are raised and lowered.

"Using tip steering," Northrop Ventura engineers say, "we can turn the chutes as much as 50 degrees per second. You can see them banking like an airplane as we direct them from the ground."

The lead engineer in the design group for both steerables and their test vehicles said that the chutes were previously turned by movements of flaps on the rear of the two trailing lobes instead of the sides. This method is called "differential flap steering."

One additional requirement for steerables that led to new capabilities was measurement of glide rate. A subsystem called a glide ratio sensor was developed and included in the test vehicle.

The steerable parachute test vehicle designed in 1963 was used with 40-foot canopies and weighed up to 2800 pounds, depending on test requirements.

A later configuration designed by Larry T. Parson last year will be capable of testing steerable systems with canopies up to 100 feet in diameter. It will be able to accommodate loads of 14,000 pounds with minor modification of the control system.

This latest vehicle is being fabricated in the Ventura Engineering Model shop.

(See CLOVERLEAF, page 8)

Mars Landing Data Updated At Congress

Parachute systems capable of soft landing unmanned space vehicles on the planet Mars were described recently by R. N. Worth, project manager of Planetary Landing Systems for Northrop Ventura. He reported upon detailed and continuing analytical

(See photo on page 3)

studies being conducted in connection with the National Aeronautics and Space Administration's Voyager program.

His paper was presented during a three-day meeting—"Stepping Stones to Mars"—sponsored by the nation's two principal astronomical societies.

Under the Voyager program, NASA plans to send an instrumented vehicle to a soft landing on Mars for measurement of atmospheric and surface properties of that neighbor planet.

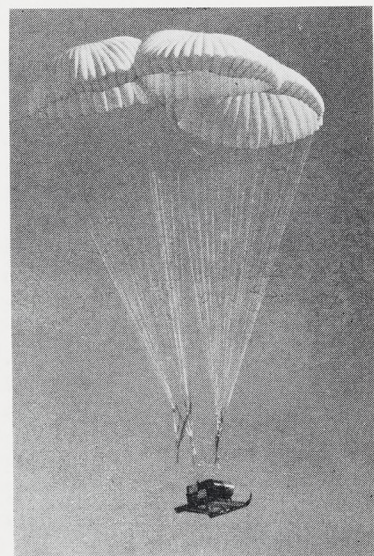
Northrop Ventura landing system studies have taken into account the latest estimates of the extremely rare Martian atmosphere. It is now believed the planet's surface air pressure is no greater than that between 100,000 and 150,000 feet altitude on earth. At the same time, a landing space vehicle may anticipate winds of 200 miles an hour with gusts up to 500.

Under such conditions, the vehicle must land softly enough and remain in proper position for its instruments to function. At the same time, the volume and weight of the landing system must be as low as possible to make room in the Mars vehicle for scientific instrumentation.

The Northrop Mars studies drew upon nearly 10 years of experience in developing the parachute landing systems for NASA's Mercury, Gemini and Apollo programs, as well as 3 years of study effort pointed directly toward Mars missions.

The studies indicate the Mars landing could be achieved with a modified Northrop-invented Ringsail parachute which has been used throughout the nation's manned space programs.

Two other new parachute configurations (See MARS, page 8)



Unique test vehicle descends under Northrop Ventura Cloverleaf.

NORWAY FOURSOME REPORT

'Wish You Could Have Been There'

"It would be wonderful if 10,000 Northrop employees could go to Norway, to be accepted as we were, to feel the confidence placed in the F-5 fighter, and to share in the enviable reputation Northrop, its products, and people, are afforded there."

Elmer Lohry, Paul Minoletti, Hubert Peck and Milton Rogers share this consensus.

The four, hourly-rated men were selected to represent all Norair employees at ceremonies there. They joined T. V. Jones, Northrop president and chairman, and other officials in Norway last month as 11 F-5's, the vanguard of 68 ordered, were delivered to the Royal Norwegian Air Force.

Proud of the aircraft they have selected to defend their nation, RNoAF officials felt it was appropriate to have men who helped build the F-5's take part in initial delivery ceremonies. This led to the selection of the four and their subsequent trip to Norway.

Now back on their jobs at Hawthorne, Palmdale and Edwards Air Force Base, the four were contacted individually for their views of the trip.

To the man, they expressed a deep feeling of humbleness and pride in being singled out for the trip. Each expressed a wish other employees could have accompanied them. And each reports

a now busy schedule relating their experiences to fellow employees, friends and relatives.

Only Mr. Peck, who served with the armed forces in Japan, had been out of North America previously. Thus the trip, which saw them making stops in Norway, England, Ireland and New York City, was a memorable excursion.

Foremost in the mind of each is the feeling the people of Norway are wonderful, without peers in friendliness, courtesy and helpfulness.

"When we arrived," Mr. Peck said, "we were immediately put at ease. From shop clerks who dashed madly about to locate English-speaking associates to serve us, to military and government leaders who went out of their way to make our stay enjoyable, everyone was wonderful.

"We had a nice chat with Norway's Crown Prince Harald," Mr. Lohry reports. "He was interested in us, our jobs and our families. And he expressed a desire to visit Hawthorne and see the F-5 in production."

Frequent mention was made of the long and close relationship between Norway and Northrop Corporation, dating back to World War II when Northrop produced N3-PB patrol bombers for the RNoAF.

Mr. Minoletti, like the others, enjoyed talking with Colonel Kristian Ostby, now retired, who flew evaluation of the N3-PB and subsequently guided contract negotiations for production activities.

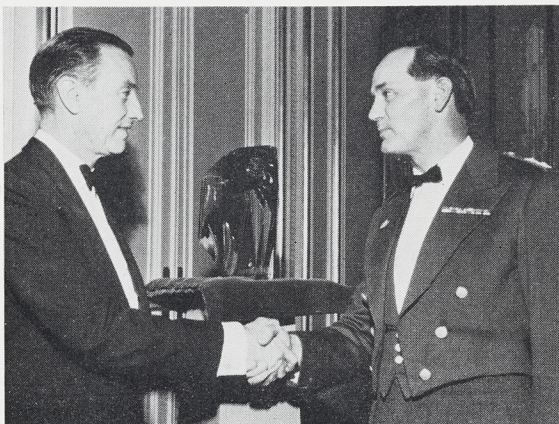
"Colonel Ostby has a remarkable memory for details and tests involving the N3-PB," Mr. Minoletti said. "We enjoyed bringing him up to date on people he remembered."

For Mr. Rogers the trip allowed renewal of a friendship with Captain Per Ekholdt who flew F-5 evaluation for the RNoAF at Edwards Air Force Base where Mr. Rogers is a flight line crew chief.

"Captain Ekholdt tells me he and other RNoAF pilots are really sold on the F-5," Mr. Rogers said. "It gives you a warm glow to know men like these place such confidence in aircraft you help build and test. And it makes doing a good job more meaningful."

"Northrop officials in Europe made it possible for us to learn a great deal about Norway

(See FOURSOME, page 7)



Mr. Jones presents Northrop Trophy to General Wilhelm Mohr, commander-in-chief of the RNoAF. All squadrons of the RNoAF will compete for the trophy, described by Mr. Jones as "a symbol of the growing association and relationship between Northrop and the RNoAF."



A NORWEGIAN SETTING—Pause in busy schedule associated with delivery of 11 Northrop F-5's to Norway, found this group of participants before one of ships delivered. They are, from left, General Jacob E. Smart, deputy commander,

U.S. Forces Europe; Margaret Tibbetts, U.S. Ambassador to Norway; Paul Minoletti, Hubert Peck, Elmer Lohry and Milton Rogers, hourly-rated Norair representatives, and T. V. Jones, president and chairman of Northrop Corporation.



Wing assembly for Maxson MKD2B drone undergoes prefitting process in hands of Marge Mertz (left) and Kay Low in Northrop Ventura plastics fabrication section. Assembly will next be placed in press for curing under heat and pressure.

Interest Mounting In World Tour

Interest in a 33-day around-the-world tour sponsored by NRC Travel Clubs continues to build as the September 2 departure date draws near.

A meeting at 7:30 p.m., April 27 at NRC Clubhouse, Hawthorne, will feature films and representatives of tour services to answer questions.

Cost per person is \$1495 and includes jet air fare, hotels, sightseeing and most meals for a tour that touches Tokyo, Hong Kong, Bangkok, New Delhi, Beirut, Jerusalem, Cairo, Istanbul, Athens and the Greek Islands. Brochures are available through Personnel Activities offices.

Cheer the New Angels, Boo the Dreaded Twins

Northrop Recreation Clubs have obtained a block of 250 tickets to the April 23 California Angel-Minnesota Twins baseball game at the new Anaheim Stadium. They are available to Northrop personnel for only \$3.50 each as long as they last.

In addition to an exciting game, the April 23 affair promises many other surprises. It will be the first nationally televised game from the new stadium. Walt Disney and his organization are joining the festivities and will present a pre-game extravaganza, starting at 10 a.m. Game time is 11 a.m.

Northrop employees purchasing two or more tickets will receive a special Angel "fun pack" loaded with surprises and special features.

Tickets are now available through all Northrop outlets.

RETURN OF W-4'S CAN SAVE EXCESS TAX DEDUCTIONS

Friday, April 15, is the deadline for returning recently issued Withholding Exemption Certificates (W-4 Forms) to Northrop paymasters.

All Northrop employees received W-4 Forms last week as an important step in instituting a new system for withholding Federal income tax from wages which becomes effective May 1, 1966.

Employees must complete the forms to indicate whether they are married or single and show the number of dependents claimed as of May 1.

Failure to comply with this step can cost employees money because the Federal Government directs that failure to provide this information may result in weekly withholding tax deductions based on single status—no dependents—leading in many instances to excessive tax deductions.

For example, a married man with three dependents makes \$100 per week. He fails to claim his deductions, resulting in a weekly withholding rate of approximately \$16.80 (single rate with no exemptions). If he claims his deductions (4) and married status, his withholding rate would be approximately \$6.50 per week.

Information distributed to all employees last week explained the new system and also included examples of withholding under the system presently in use and the one becoming effective May 1. This information was for use as examples only, actual withholding rates may vary slightly from this formula.

The important thing now is to complete the new W-4 Form without delay and return it to the paymaster by Friday.

Savings Plan Open For Changes in May

Northrop participants in both Hourly and Salaried Savings Plan may change the amounts of their contributions and non-participants may enroll in either plan to be effective May 2, 1966.

Maximum contributions are \$6 for hourly rated employees and five percent of base salary for salaried personnel.

Cards authorizing a change or initial entry in the plan may be obtained from Northrop Industrial Relations (Personnel) offices.

SEVEN AWARDS PRESENTED

Five Perfect Records Pace Safety Performance for Year

Seven awards—five of them for perfect records—were presented Northrop facilities last week by the Greater Los Angeles Chapter of the National Safety Council in recognition of "high standards in occupational safety" for 1965.

Pacific Curtainwall, Inc., wholly-owned subsidiary based in Long Beach, took two awards in the Metals Products and Steel Fabricating category. Both its shop section and field section posted perfect safety records for the year.

Northrop Nortronics' Hawthorne facility earned a first

place award in the Electrical & Electronics Division competition, by posting a perfect record.

Two Northrop Norair facilities—El Segundo and Edwards AFB—also won first place awards for perfect records in their respective categories.

Mariposa facility in El Segundo, competing in the Wholesale, Warehouse and Storage category, has logged a perfect safety record in four of the past five years. The Edwards facility previously had accident-free marks in 1959, 1961, 1962, and 1965.

Northrop Architectural Systems, headquartered in the City of Industry, won second place in the Miscellaneous Metal Products category in competition with 21 other companies.

Nortronics Palos Verdes, entered in the same category as Nortronics Hawthorne, was awarded second place honors.

"The Northrop record this year was the best in the company's history," according to Lee Johnson, chief safety engineer at Norair and chairman of the awards program for the Los Angeles chapter.

There were eight Northrop

entrants in the contest, which began in January of 1965. At the end of the year, the Safety Council tabulates results of monthly reports submitted on lost time accidents.

Scoring is based on the number of lost time industrial injury cases per million man-hours worked.

"It was especially significant that facilities with fewer employees ranked so high," he added. "Normally, it is a disadvantage because the fewer man-hours worked the more damage a single accident can

do to your record.

"The Palmdale facility, for example, only had two lost time injuries all year, but because its total man-hours was relatively small its frequency rate for the year was 5.00."

Northrop Norair continued to improve its record in 1965, posting a 1.15 frequency rate, or a little more than one accident per million man-hours worked. In the past three years, Norair has climbed from 11th to 4th place in the aircraft assembly and manufacturing category.

Bruce MacDonald Succeeds Perego In Corporate Post

Bruce MacDonald, manager of Northrop's central regional office at Dayton, Ohio, has been appointed corporate director of domestic marketing operations, Glenn R. Lord, vice president of Marketing, has announced.

He succeeds Frank S. Perego, who recently was appointed manager of Marketing for Northrop's Norair Division.

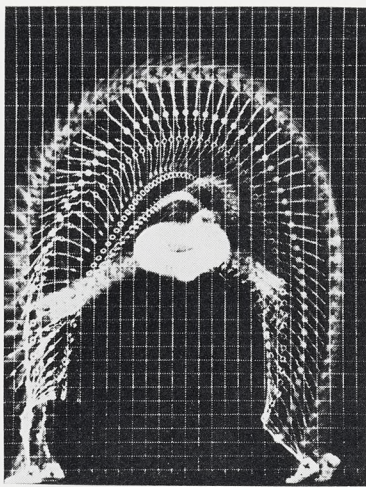
Mr. MacDonald has been manager of the company's Dayton office for the past four years. He joined Northrop 11 years ago as an engineer. He is a graduate of the University of California school of engineering. He served as an officer in the U. S. Air Force in World War II and during the Korean conflict.

Page to Consult Firm On Italian Station

Page Communications Engineers will serve as consulting engineers in the preparation of procurement specifications for electronic subsystems to be incorporated in a high-capacity satellite communications ground station in Fucino, Italy. Page also will evaluate the equipment and establish quality control guidelines.

The station will be built by Societa Telespazio of Rome for use with the global satellite communications systems planned by INTELSAT for operation by 1967-68. Telespazio is already active in satellite communications with an experimental ground station at Fucino now working with the Early Bird satellite.

Page designed and built the highly advanced Gemini UHF communications stations for the U.S. Air Force at Grand Bahama, Antigua and Ascension Islands. Page is also the developer of a transportable satellite communications Earth station to be used by Comsat Corporation and the Overseas Telecommunications Commission of Australia to provide communications and data acquisition for the Apollo Manned Lunar Landing Program.



Backflip on Northrop Space Laboratories' lunar gravity simulator looks like this in photo taken with NSL's special biomechanics data camera. Rotating disc shutter helps capture series of motions on one film frame for motion dynamics research.

Rotary Show Prizes Won by Venturans

An orchestra including two sons of a Northrop Ventura employee, and a mezzo soprano who works at the Division, won first and second prize as performers during the 1966 Rotary International variety show in Thousand Oaks.

The Serenaders, an orchestra of grade school boys, includes Steve and Rick Still, 14 and 12 years old, sons of Henry Still, head of Division Public Relations. The orchestra's first prize was \$200.

Steve plays lead trumpet and Rick lead saxophone.

Lupe Zuniga, secretary to Chuck Merlian, won the second prize of \$150.

Headed by music teacher and arranger Eddie Allen, the band will save the prize toward a trip to a music festival at Lake Tahoe this summer.

Recipient of Gifts Dies in Vietnam

James R. Reilly, 19, nephew of Northrop Ventura employee Lillian Reilly, has died a hero in Vietnam.

Marine Private Reilly smothered an enemy hand grenade with his body to save the life of a foxhole mate he hardly knew.

Mrs. Reilly, of the Electrical branch, Production Operations section, joined other Division employees early this year in sending packages to servicemen in Southeast Asia, including her nephew Jim.

AD ASTRA PER ASPERA

National Association Elects Chuck Shelly; NSL's Christensen Heads Local IES

C. P. "Chuck" Shelly of Nortronics Hawthorne was installed early this month as president of the American Association for Contamination Control, a national organization he helped found five years ago.

Mr. Shelly and other AACC officers were installed at the conclusion of the Fifth Annual Technical Meeting held in Houston, Texas.

Serving two years as a regional director, two years as a national director and for the past year as executive vice president, Mr. Shelly has helped guide AACC from an initial membership of 30 to a present force of over 1500 in just five short years. He has been especially active in promoting standardization and specification definition for environmentally controlled facilities throughout industry.

In addition to his duties as a general supervisor in Operations at Nortronics, Mr. Shelly has helped guide and counsel on the subject of clean rooms throughout Northrop.

Going international with controls on man's contamination problems, and the development of material and criteria for university degree courses are two key efforts Mr. Shelly would like to see accomplished through AACC guidance during the coming year.

In his acceptance speech at Houston, Mr. Shelly said:

"The expanding complexities of our chosen discipline must forever be our basic concern—we are an organization that must in dynamic fashion, disseminate its educational and knowledgeable benefits with imagination and clarity, unmistakably encased in a cloak of service."



Mr. Shelly

ENVIRONMENTAL SCIENCES

A Northrop Space Laboratories engineering specialist has been elected president of the Los Angeles chapter of the Institute of Environmental Sciences.

Mark Christensen, who is a member of the Northrop team supporting Jet Propulsion Laboratory on the Mariner program, was installed as head of the Institute's largest chapter April 4 at the Cockatoo Inn in Hawthorne.

The Institute, comprised of specialists in environmental testing, was founded in 1957 as the Society of Environmental Engineers. It was merged in 1959 with a related east coast society, at which time the combined organizations took the present name.

Mr. Christensen was a member of the founding group on the west coast in 1957 and has served in at least one office each year since that time. For the past three years he has been program chairman.



Mr. Christensen

MOVES TO NEW FACILITY

Astro Tech Expanding as Page's West Coast Division

Astro Technology, west coast division of Northrop Page Communications Engineers, is engaged in an expansion program which is expected to include a threefold staff increase this year.

Highly specialized in tracking, telemetry and command techniques, the Mountain View, California, operation recently expanded its capabilities by acquiring the assets and personnel of the Alpar Corporation of Palo Alto.

The acquisition, known as the Astro Structures Operations, "will add greatly to Astro Technology's expansion program by augmenting the company's capability in the design, manufacture and installation of antenna structural components," according to General Manager J. C. Keyes.



Mr. Keyes

Astro Technology was formerly a subsidiary of Page Communications, Northrop subsidiary based in Washington, D.C. It was made a division late last year.

Astro Technology announced last month that a \$240,000 contract had been awarded by Dynatronics, Inc., to deliver and install support equipment for Pacific Missile Range tracking antenna systems.

Other major programs in progress include modification of a telemetry tracking antenna at Pretoria, South Africa, for the U.S. Air Force Eastern Test Range, and delivery of two telemetry acquisition systems to the U.S. Army at White Sands Missile Range, New Mexico.

Astro Technology is also under contract to the Naval Ordnance Test Station at China Lake, California, for a digital data system for instrumentation radars and for a program of analysis

directed to missile warhead effectiveness.

A major target in expanding its technical capability is large scale programs



New home of Astro Technology, west coast division of Northrop Page, is at Mountain View.

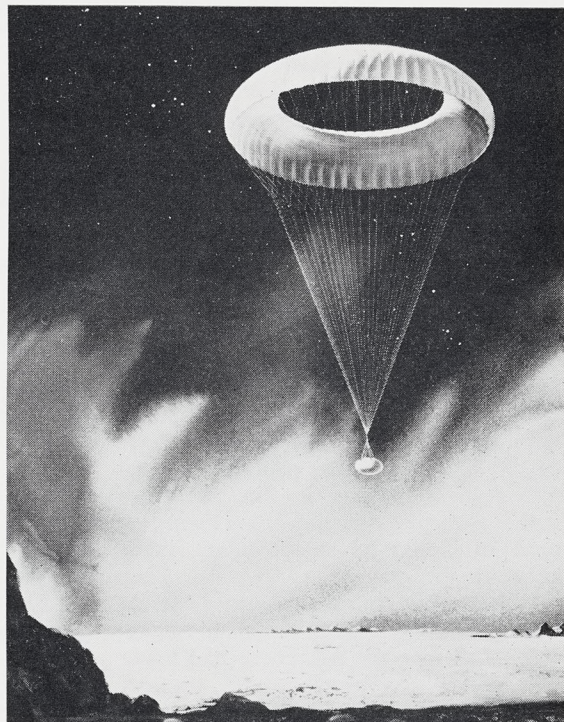
concerned with data acquisition, timing and control equipment, and diversification into the fields of medical electronics and underwater communication and instrumentation.

To accommodate expanding laboratory and manufacturing requirements, Astro Technology was recently relocated from Palo Alto to a new facility in Mountain View.

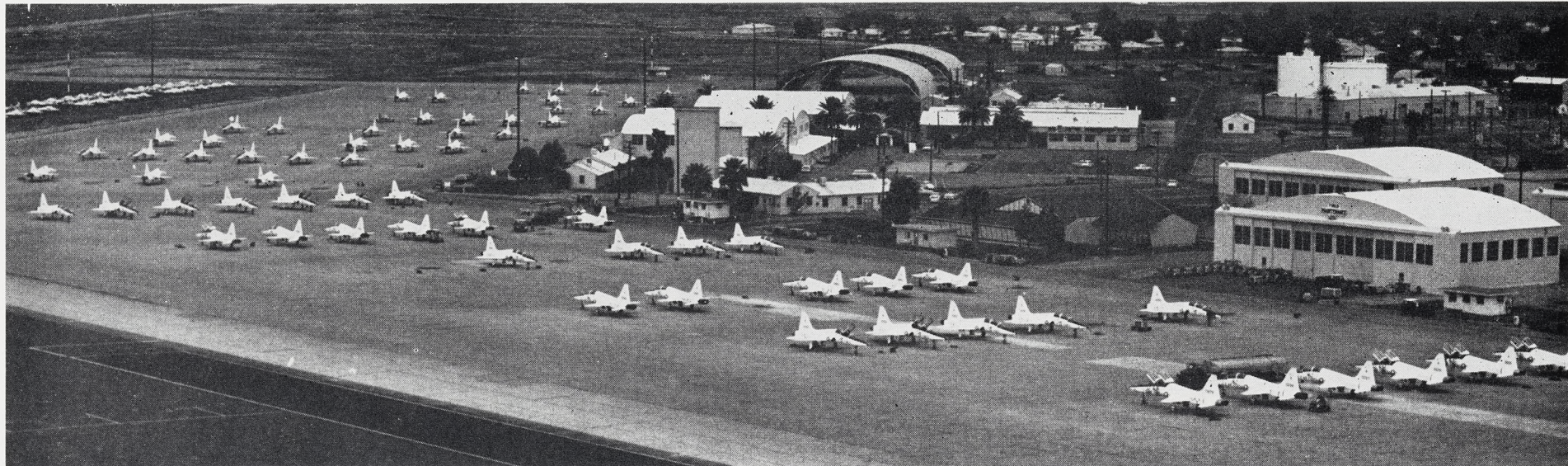
Founded in 1961, the company was acquired by Northrop Page in 1963 as a wholly-owned subsidiary.

In 1964, Astro Technology won a competitive program to provide a wide-band telemetry tracking antenna for the U.S. Navy Electronics Laboratory, which uses the antenna to acquire data from weather and meteorological satellites.

Mr. Keyes, one of the company's founders, is a vice president of Northrop Page as well as chief executive officer of the division.



Unmanned soft landing on Mars may look like this, with large annular parachute from Northrop Ventura protecting scientific instruments in oval space capsule from impact. Concept is most promising of several envisioned by Ventura Division after studies in connection with NASA's Voyager program. Concepts were described by R. N. Worth at a recent "Stepping Stones to Mars" meeting sponsored by the nation's two leading astronautical societies.



Northrop-built T-38 trainers form impressive scene (above) on flight line at Williams Air Force Base, Arizona. Student pilots (left) march by parked aircraft during graduation ceremonies. And 11 sleek trainers (right) bank for a turn as student pilots receive initial supersonic training.



650,000 FLIGHT HOURS

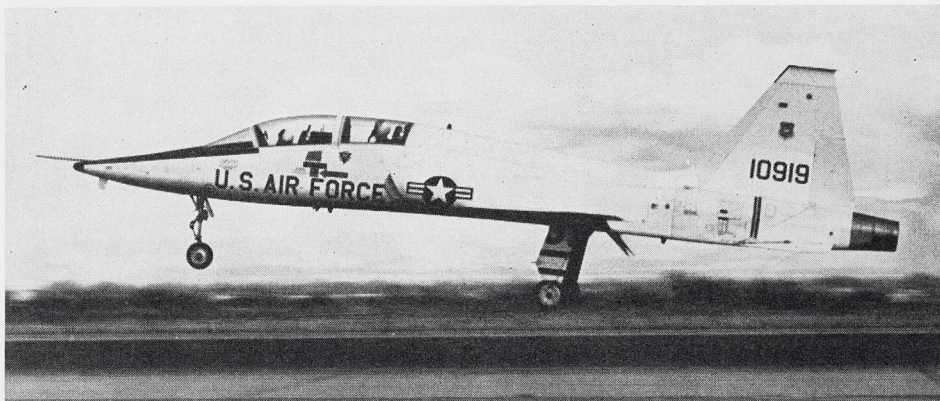
The T-38 Five Years Later: Still the Safest Jet in the AF

Just five years ago this month the U.S. Air Force Air Training Command began a program of student flight training in the new Northrop-built T-38 trainer aircraft and class 62F went on to become the first USAF group of student pilots to fly at supersonic speeds before earning their wings. Since then, nearly 3700 Air Force pilots have completed their training in this 800-mile-an-hour airplane which has logged a total of approximately 650,000 flight hours in the service.

The advent of the Century Series (F-100 through F-106) supersonic fighter aircraft into the Air Force had made it necessary to provide pilot trainees with a supersonic trainer aircraft to bridge the gap between these new fighter airplanes and the slower trainers then being used.

The T-38 was especially designed for safety by a team of USAF and Northrop engineers working together. The care exercised in the airplane's original designs have been reflected in its remarkable safety record during its five years in the USAF. For this period the T-38 has achieved the leading safety record for any supersonic aircraft in the Air Force. Last year the twin-engine trainer's accident rate was a very low 3.8 per 100,000 flight hours.

The 645th T-38 is being delivered by



Northrop to the USAF this month with Craig Air Force Base, Selma, Alabama, scheduled to become the ninth ATC base to utilize approximately 80 of these airplanes in its training program. Sheppard AFB, Texas, recently announced as the base for German Air Force flight training beginning this fall, will also employ T-38's in its flight program.

Students at Williams AFB, Arizona, currently fly T-38's at a rate of more than 3800 flight hours per month, which is the highest for any USAF base. There are 85 of these aircraft at Williams with approximately 400 students from Germany, Saudi Arabia, Morocco, and the U.S. now in training there.

It is anticipated that the total number of flight hours at this base will increase to approximately 5000 per month, beginning in July of this year.

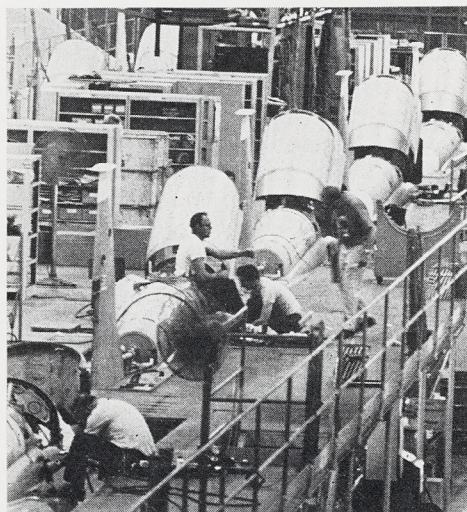
In addition, The Federal Republic of Germany is programmed to receive 46 of the Northrop trainers while the U.S. National Aeronautics and Space Administration is utilizing 15 of the aircraft with nine more scheduled to be delivered by the end of next year. The Strategic Air Command is using eight and the USAF Systems Command 20.

Northrop's Norair Division was first awarded a contract by the USAF in 1956 to develop the T-38. The Air Force had only subsonic training aircraft and an increasing need had arisen

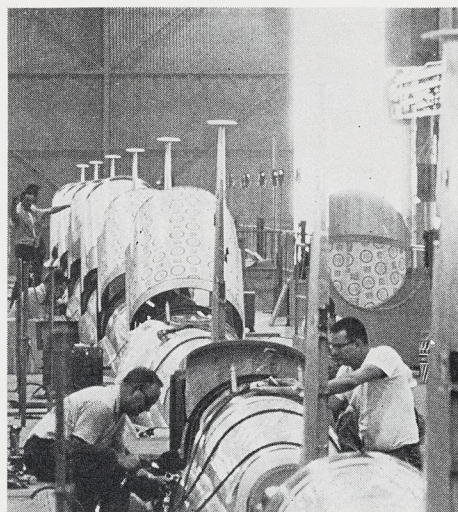
to augment the use of the comparatively slow existing trainers with a new supersonic training airplane. The Century Series of fighter aircraft were then entering the USAF with first delivery dates ranging from 1954 to 1958. A more logical flight training sequence between trainer and combat aircraft led to the development and manufacturing of the T-38 at Northrop's Hawthorne facilities.

The T-38 demonstrated its outstanding safety characteristics even before it was made available to Air Force student pilots in 1961. In 1959 it became the first supersonic aircraft in the USAF's history to complete its flight testing without a major accident. The T-38 was first flown in April 1959 at the Air Force Flight Test Center, Edwards AFB, California, and subsequently went on to accumulate more than 9000 flight hours in USAF's ATC service without any mishap serious enough to affect a major system of the aircraft.

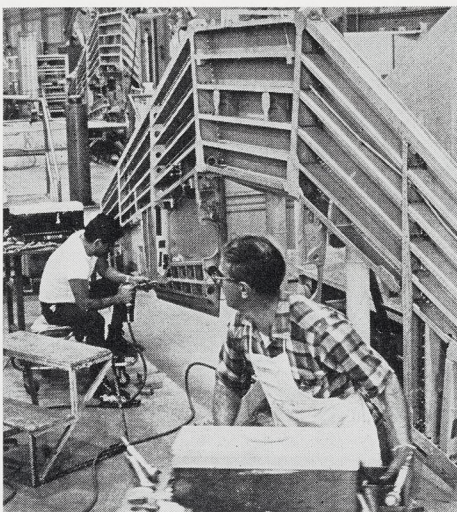
When the ATC made the decision to have a supersonic training airplane developed, in the early 1950's, it was realized that along with the many operational advantages of training in a faster-than-sound aircraft and the closer alliance which would be formed with the Air Force's jet fighters, the new (See TALON, page 6)



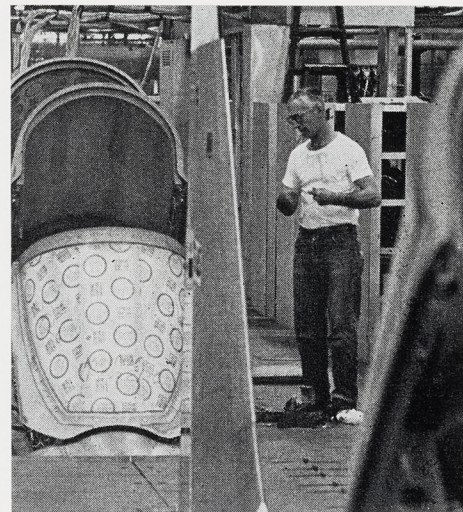
There's no fanfare on the T-38 production line on the plane's fifth birthday. It's business as usual



for F. J. Theroux, Al Graman, Stan Hunter, Jack Harris, W. B. Gonzales, L. T. Leon, Jim Prebor,



and Eddy Lumaye (from left to right in above four photos), and the hundreds of other men and



women who have built the safest supersonic jet in the Air Force inventory for five years.

Moon Vehicle Studied for Earth Use

Northrop's Norair Division, including Northrop Space Laboratories, is best known for its aviation and space programs. But a host of terrestrial vehicles are part of the Division's inventory of ideas.

From earth application of concepts developed for the Lunar Roving Vehicles to 200 mph trains, Norair has at least a passing interest in earth surface transportation devices.

The Lunar Roving Vehicle suspension employs a unique walking beam system invented and developed by Bill Sponsler of NSL. It is also being considered for use on terrestrial Hi-Mo (high mobility) vehicle.

The LRV has eight wheels attached in pairs to the ends of four walking beams. Each beam is mounted to the body at a pivot point near the beams' center.

One beam fits on each end of an axle. As the angle of the beams relative to the surface is changed by the operator, the wheels move up or down.

On the model the walking beams are individually controlled and powered by 12 volt d.c. motors. Each beam can be driven to any desired position or locked in any position with either both of its wheels or one in contact with the ground. The beams can be left free with the wheels following the contours of the terrain.

Mobility provided the vehicle by the eight-wheel suspension includes pivoting in place, bridging crevasses or obstacles unpassable for other vehicles, or climbing 70 percent hard-surface slopes. Ground clearance is at its best when the four beams are vertical and only four wheels in contact.

In sand, snow or mud, the beams can be continuously rotated through 360 degrees. The wheels alternately come in contact with the terrain, "walking" Hi-Mo out of the region of poor traction.

Using its own ramp, the walking beam vehicle can overcome (See **VEHICLE**, page 7)



Machinist Ed Bubla of Nortronics Anaheim checks progress of work on T-38 seat brackets being turned out in Wilson profile machine.

Page Wins Contract For AF Terminals

Northrop Page Communications has been awarded a \$2.9 million contract by the Air Force to design and furnish six tropospheric scatter communications terminals to the Oklahoma City Air Materiel Area.

Based on an original design concept by Northrop Page, Washington, D.C.-based subsidiary, the terminals are air transportable and can be readily placed in operation anywhere in the world. Their mobility provides the Air Force an efficient and rugged tactical communications systems.

Latest Theatre Party To See Zhivago

Another popular all-Northrop theatre party is slated for 8 p.m., May 15 at the Hollywood Paramount Theatre for the showing of Doctor Zhivago.

Through NRC sponsorship, regular \$3.50 logs and \$3 orchestra seats will be available for \$3 and \$2.55 respectively. Tickets may be obtained through all Northrop ticket outlets.

The winner of five Golden Globe Awards and nominee for 10 Academy Awards, including best film, Doctor Zhivago is an adaptation of Boris Pasternak's novel. It features an all-star international cast.

AFTER COMPLETE TEARDOWN

Test T-38's Back Together Again

Northrop Corporation has returned to the Air Training Command two T-38 Talon jet trainers involved in a unique test program carried out at Northrop Norair.

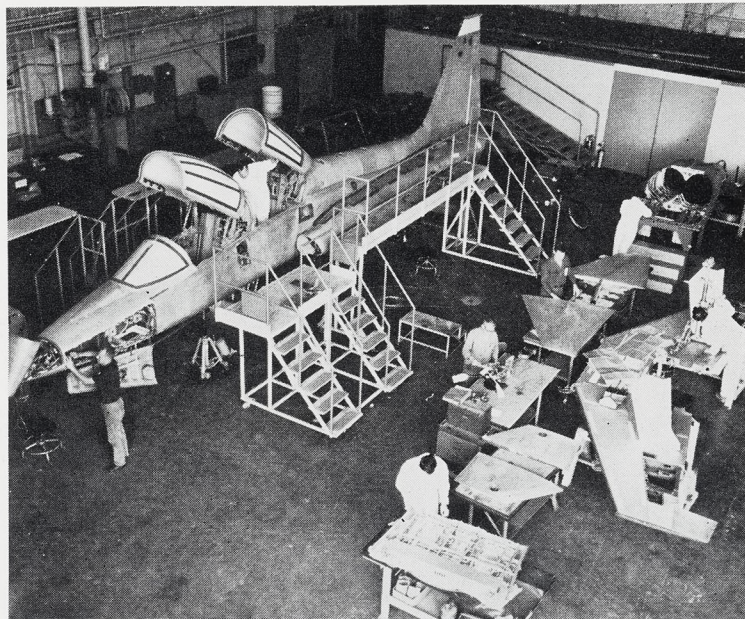
Following a complete disassembly and thorough non-destructive test effort, the aircraft were re-assembled, repainted and flown back to Reese Air Force Base, Texas. One was delivered late in 1965, the other early this month. Norair carried out the program under contract to the Air Force's San Antonio Air Materiel Area.

The aircraft were first carefully taken apart, piece by piece, before beginning the unusual laboratory safety test program. The findings of the program are anticipated to benefit future operations of the more than 650 T-38's now in service with the USAF.

The two aircraft chosen for the tests had each been flown a "high hour" total of 1650 hours by the ATC and were in good condition when they were returned to Northrop for the project, considering their lengthy service.

The T-38, for years the safest supersonic airplane in the USAF, has established safety records for all aircraft of this type in the USAF inventory since 1961, when it first entered the service. The rigid test program recently concluded at Northrop on the two T-38's, was an "ounce of prevention" operation set up to discover even the most minor kind of flaws, existing or potential, which could affect future operations of the other T-38's now in service. Close scrutiny of all control and structural assemblies of the two aircraft as well as X-ray tests of metals and connecting components were a part of the over-all tests.

All electrical wiring and components were put through high voltage tests. Wing structures and honeycomb panels were thoroughly X-rayed. Dyes were sprayed on various parts to re-



TOUGH TEST—Air Force T-38 jet trainer undergoes almost entire disassembly and inspection at Norair after 1650 flight hours. Nose wiring and controls in cockpit are checked at left while horizontal stabilizers, nose wheel, wing tips are laid out at right. Eight months of exacting laboratory testing was completed under contract to USAF San Antonio Air Materiel Area.

veal even the most minute cracks in the metal. Airframe hulls were completely stripped of all sealants and given a variety of tests. The team of experts assigned to the project became intimately familiar with even the rivets, screws and connections of the aircraft. Exacting wear measurements were made on critical components and systems and detailed findings were catalogued into groups of meaningful figures.

When the two airplanes were turned back to Northrop last year by the USAF for this program, they went first to the company's assembly facilities in Palmdale for functional test flights. In this phase, their performances were compared with those of later T-38 production aircraft.

Following special systems tests at the Palmdale facility, the two airplanes were then stripped of all paint and markings and trucked to the Northrop Hawthorne plant. Here every part and system, not permanently fastened to the airframe, were removed for the nondestructive tests.

To facilitate testing in their

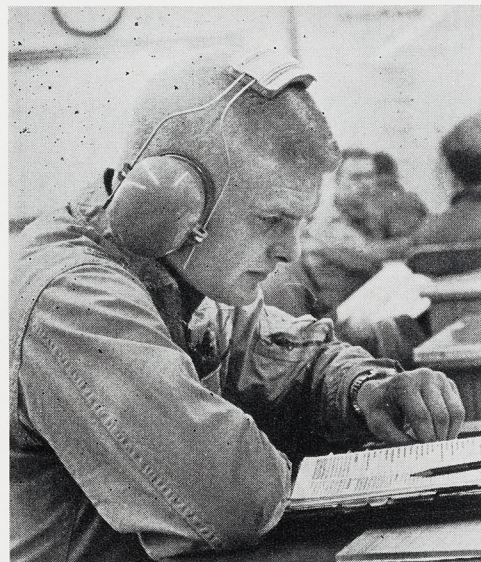
extreme "broken down" state, the two aircraft were separated into the following major individual components: forward fuselage, wings, aft fuselage, seats, horizontal tail, nose landing gear, wing tips, and speed brakes.

A 10-man experienced production crew, consisting of electricians, mechanics and other specialists, has been continuously assigned to the project, from the disassembly to the inspection and reassembly phases.

The first of the two T-38's was returned to Palmdale, where it was repainted and put through standard flight acceptance tests. It was delivered back to the Air Force near the end of 1965. The program results for both aircraft will continue to be relayed to the USAF for followup use in the field.

The second of these airplanes was reassembled and returned to the USAF last month and the results will be effectively utilized by the Air Force in maintaining the nearly 700 T-38's now in service with ATC.

GERMANY'S STUDENT PILOTS FIND ROOM TO SPREAD THEIR WINGS



German Air Force student pilots will begin training in greater numbers in the United States this year, according to Lieutenant General William W. Momyer, commander of Air Training Command. Recently signed contracts between the United States and the Federal Republic of Germany call for establishing an undergraduate pilot training school at ATC's Sheppard Air Force Base near Wichita Falls, Texas. The basic contract covers the first year of a minimum five-year program. Prior to this contract taking



effect German pilots are training at Williams AFB, Arizona, where the above photos were taken by Northrop photographer Bill Cox. Of the 93 aircraft ordered for the new training program, 46 are Northrop T-38 Talons, the 800-mile-per-hour trainer which has had the most outstanding safety record of all USAF supersonic aircraft during the past five years. In the photo at left a German student pilot bones up on his hardware with the help of an elec-

tronic translator. Briefings and de-briefings (center) occupy a large part of a student's time. While a German student pilot is in the air, it is required that a fellow countryman be in the control tower (right) at all times to prevent a language mixup. When the first class begins at Sheppard, later this year, training will be similar to that given USAF pilots. This includes 132 flying hours in the Cessna T-37 primary phase jet aircraft and 130 hours in the super-



sonic T-38. An additional 349 hours of classroom instruction will be given. Benefits of the program to the U.S. includes considerable relief to the balance of payment deficit. The German Air Force will pay tuition to the U.S. at the rate of nearly \$10,000,000 annually plus an initial equipment purchase of \$42 million. Training in the Southwest U.S. permits the German AF to overcome the inclement weather and air space saturation problems common throughout western Europe.

A DAY FOR NOSTALGIA

Airport, Northrop Share Common Memories

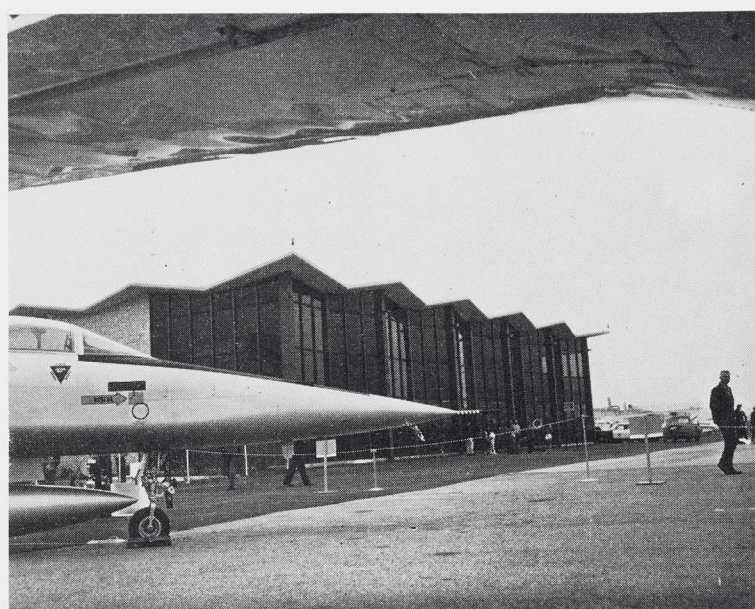
Nostalgic memories were very much with veteran Northrop Corporation employees attending the opening of Hawthorne's new airport terminal recently for Northrop and the airport literally grew and developed together. They are, to many, synonymous.

Northrop broke ground for its first facility in Hawthorne in late 1939 and planning progressed for an airport. By late 1940 the U.S. Army Corps of Engineers and the Works Progress Administration were busy building a main strip and taxiways. On June 19, 1942, the work was completed and Northrop contracted to operate the facility. It became Northrop Field. In April 1948 the City of Hawthorne assumed control and Hawthorne Municipal Airport was born. The original main landing strip was 3900 feet long, but was extended to its present 5000-foot length during World War II.

Roy Wolford, like a lot of Northrop old-timers, always links the early field with, of all things, asparagus.

"The area was once an asparagus patch and for five years, despite repeated attempts to kill it, asparagus would shoot up between the strip and taxiways," Mr. Wolford said. "The jackrabbits came from miles around to feast on it and created another hazard. I remember men going out and chopping it down to prevent it catching fire from engine exhausts."

Ed Freitas was Northrop's first ground-based radio operator. His original facility was an old



MODERNISTIC PAIR—Sleek Northrop F-5 stands on static display before sweeping new administration building at Hawthorne Municipal Airport during open house ceremonies April 2.

shack equipped with packing crates and an aircraft radio unit he converted for the job. Engineering was then responsible for control operations and Mr. Freitas would man his station after receiving a telephone call of a pending flight.

"Northrop added a room on stilts, all glassed in and equipped with regular ground radio equipment. We were really living then, until baseball season began," Mr. Freitas remembers.

He referred to a small baseball diamond used during lunch periods that was near the new tower. After a few well-hit baseballs

shattered glass windows, Maintenance added protective chicken wire to that side of the tower. "This led us to let out a loud crow anytime a ball hit and bounced harmlessly away," Mr. Freitas recalls.

When Engineering functions were relocated well away from the control tower, Mr. Freitas was given a bicycle to cover the distance.

"We all knew a flight was pending when we saw Ed Freitas peddling furiously in an eastward direction," said George Keenan. "When he was going west it was a sure sign things were back to normal."

Mr. Keenan is now an FAA watch supervisor at the Hawthorne Airport. But then he was one of the first official control tower operators hired by Northrop when this function was removed from Engineering. Mr. Keenan remained in this capacity with Northrop until Hawthorne took over the airport in 1948 when he took up his present duties.

"There were a lot of memorable flights out of the airport during those days and each attracted its share of spectators," Mr. Keenan said. "But I guess nothing quite like the flights involving the 'Flying Wing.'"

Max Stanley flew both propeller and jet versions of the "Wing"

on maiden flights from the airstrip. "People have asked me if getting such a big aircraft off a short strip was not a hair-raising experience," Mr. Stanley said. "It was really an easy flight and I have had more trouble with other types of aircraft."

While the Flying Wing was by far the most spectacular aircraft to operate from the airstrip, it had to share honors as the largest aircraft with the C-124 that called at Northrop to pick up Snark missiles. It, too, was a big aircraft.

In reviewing a long and harmonious Northrop-airport relationship, one fact stands out. Every Northrop-built aircraft, with the exception of current T-38's and F-5's, have made at least their maiden flight off what is now Hawthorne Municipal Airport.



The airport in 1965.

Disneyland Tickets Put on Sale by NRC

Tickets for the annual "Northrop Night at Disneyland" gala sponsored jointly by all Northrop Recreation Clubs went on sale this week throughout Northrop facilities.

This year the event will be May 27, the Friday before the long Memorial Day weekend. The hours are 8 p.m. to 2 a.m. One ticket price (\$3.95 per person) entitles the holder to free use of all Disneyland facilities.

City Airport Fights Trend, Moves Ahead

A standing room only crowd of more than 1000 persons turned out April 2 for the dedication of Hawthorne's new airport administration building.

They heard California Lieutenant Governor Glenn Anderson praise the city for its forward thinking in continuously improving one of the nation's 20 busiest airports in a time other cities are shutting down their airports across the state.

At one time there were 63 community airports in the Los Angeles area compared to nine today, Mr. Anderson reminded listeners. This has occurred at a time when private ownership of airplanes was increasing to its present all-time high of 20,000 light aircraft.

At a luncheon following the official dedication, Northrop Norair Administration Manager Tom McCarthy, the principal speaker, accepted the city's expression of appreciation for Northrop's long-term assistance with the airport project.

A healthy community such as Hawthorne is extremely important to Northrop's business and technical position in the aerospace industry, Mr. McCarthy said, in that it provides an environment favorable to recruiting and maintaining employees.

Singled out for special thanks during the luncheon, which was sponsored by the Hawthorne Chamber of Commerce, was Max Stanley, Norair's chief of Flight Support Operations and a member of the Chamber's Aviation Committee.

Mr. Stanley, former flight test pilot for Northrop, flew many of Northrop-developed aircraft in their maiden flights from the Hawthorne airstrip.

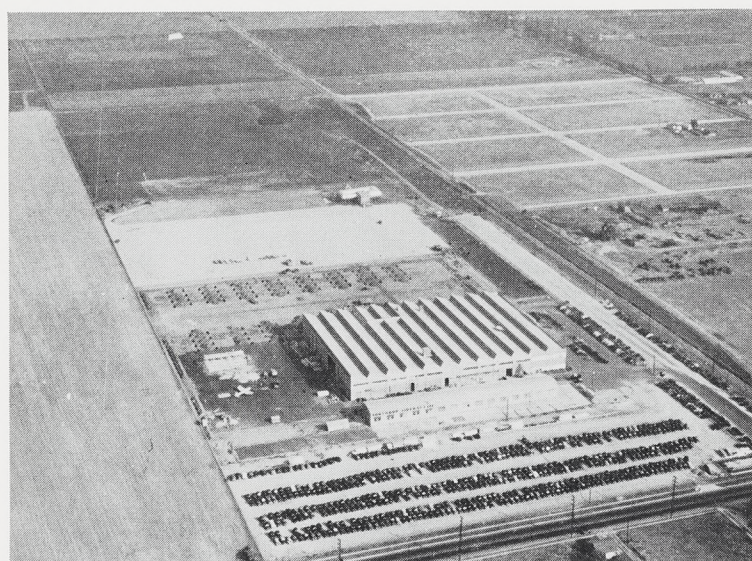
NORTHROP NEWS

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ASPARAGUS HAVEN—Early view (1940) of Northrop Norair shows ground broken in left foreground for new airport. Once used to grow asparagus, area was plagued with same for several years.

TALON: Designed With Safety in Mind, It Remains Unequaled

(Continued from page 4)

speedier trainer would also require certain very special new safety designs.

Many unusual built-in features were originally incorporated into the design of the T-38 and were implemented by a special USAF flight safety program developed along with the airplane to further assure it of being the safest supersonic jet in the Air Force. The care taken in this original planning continues to be reflected in the consistently leading safety record of the airplane.

The entry of the supersonic T-38 into the USAF inventory also created other advantages. It enabled the ATC to gear up its flight safety indoctrination program for the first time to supersonic flying orientation levels beginning with the student's primary training.

The T-38 is a two-place, high altitude, supersonic, low-wing, twin-engine jet-propelled aircraft with pres-

surized cockpits enclosed by individual jettisonable canopies. It has a tandem seating arrangement with zero altitude rocket ejection seats provided for both crew members.

The lines of the fuselage are characterized by "coke bottle" curvature at the wing junction point, in conformance with the "area rule" theory. Wings, placed toward the rear of the fuselage, just aft of the air scoops have a swept leading edge. The wing design allows the airplane transition to supersonic speeds without "tuck under" or "pitch up."

The two 7 to 1 thrust-to-weight ratio General Electric engines, equipped with afterburners, enable the T-38 to become airborne after a take-off run of just 2300 feet. The airplane climbs at a sea level rate of 30,800 feet per minute and can operate at a ceiling above 54,000 feet. It has been flown at nearly 900 mph.

To conceive the USAF's first supersonic training airplane a hand-picked ATC T-38 project team was appointed by the Air Force to work with Northrop. It was anticipated that this team arrangement, the first of its kind, would assure that the new aircraft would have performance capabilities similar to supersonic combat aircraft, economy of maintenance and operation, yet would retain the flying qualities consistent with safety requirements for trainer aircraft. The formation of the closely associated team composed of user and manufacturer personnel was an historic pioneering effort at that time. The success of the competent planning of this team's effort resulted in many outstanding innovations in the long and noteworthy flight accomplishments of the T-38.

Just 46 feet four inches long, with a wingspread of only 25 feet three inches, the T-38 is a small airplane

with the advantages of small, lightweight major components, such as engines, aft fuselage, and canopies. The removal of such equipment from a T-38 requires a much simpler type of ground handling equipment than is needed for heavier aircraft and waist-high working accessibility to vital components facilitates troubleshooting operations.

To give the T-38 maximum availability to its user it is equipped for exceptionally fast mission turnaround time. This is made possible by single-point refueling and minimum preflight inspection requirements.

Five years ago, when USAF ATC's basic pilot training class 62F became the first group of Air Force student pilots to train in the Northrop T-38's, the records show that during this training no major incidents or accidents occurred. This first class historically launched a continuing T-38 safety record for faster-than-sound aircraft that remains unequalled.

Classified

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads. Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

For Sale
Home, 3-bdrm., family rm., fireplace, 1 1/4 baths, lge. detached gar., 20x24 Doughboy pool w/concrete decking, 15 bearing fruit trees, covered patio, 80% loan commitment, \$31,500. Torrance, FR 1-2704. A
Ford, 1959 Galaxie 500 2 dr. h/top, r/h, p/b, p/s, p/seat, new tires, \$300. Rolling Hills Ests., 325-3057. A
Piano, Fairbanks, upright, mahogany, \$150. Box 701. A
Karmann Ghia, 1957, new brakes & battery, \$470. Pasadena, SY 8-3002. A
Bicycle, Deraileur, 10-spd., \$40. Manhattan Bch., 372-6436. A
Watch, Elgin embraceable, 19 jewels, case, guarantee, waterproof, shockproof, \$40. Gardena, 327-0662. A
Chevrolet Bel Aire, 1956 4-dr. sedan, V-8, auto. trans., r/h, \$245. Fullerton, 714-526-4275. A
Pups, min. toy poodle, \$35 ea. Orange, 714-639-0325. A
Surfboard, Jacob's 9'6", clear foam redwood strip, \$85. Manhattan Bch., FR 4-6003. A
Pup, German shepherd, 10 mos. old, all shots, obed. trained, \$10. Garden Grove, 714-892-5450. A
Coffee Table, wrought iron, w/2 end tables, black & white tops, \$20. L.A., 645-6815. A
Oscilloscope, Heathkit, push-pull, extended range, model 0-5, \$45. Torrance, DA 6-8273. A
Skis, men's wood, safety bindings, \$10. Box 702. A
Refrigerator, Norge, w/deep freeze, \$65. L.A., 766-2809. A
Range, O'Keefe & Merritt, chrome top, griddle, broiler, \$50. Redondo Bch., 370-7967. A
Ford station wagon, 1959, air cond., p/b, p/s, Country Sedan, \$375. L.A., 474-3433. A
Home, in Running Springs, 2-bdrm., lge. paneled living rm., center fireplace, sun-porch, bltins., 1-yr.-old, \$15,900. Wilmington, 834-4184. A
Bunk Beds, rock maple, w/ladder, 2 chests of drwrs, desk & chair, \$100. P.V. Ests., FR 5-4742. A
T-Bird, 1956, h/top, silver gray, recent o/haul, paint & tires, auto. trans., orig. owner, \$1275. Pacific Palisades, 454-2057. A
Camera, Nikon 35 auto., never used, set of wide angle & telephoto lenses, cost \$220, \$120. Box 703. A
Speaker System, deluxe 3-way, modern oiled walnut finish & contrasting grill cloth, 12" bass Woofer & a 3" dynamic Tweeter, matched & balanced by a 2-way crossover network, 25-16,000 cps. freq. response, \$25. Hawthorne, 676-6021. A
Mobile Home, Majestic, 10'x41', 2 yrs. old, close to Northrop, small down, balance \$50 monthly, \$4000. Hawthorne, 676-7387. A
Plymouth, 1959, 4-dr., 6 cyl., std. trans., r/h, seat belts, \$275. Redondo, FR 5-0915. A
House, 4-bdrm., family rm., 2 1/2 baths, 1 acre, horses OK, near Northrop Ventura, \$35,000. Somis, 805-482-1186. A
Cemetery Plot, 4 spaces, endowment care, compl. developed, Glen Haven Sunny Slope sect., \$200 ea. Gardena, 324-7442. A
Oldsmobile, 1965, Delta 88, p/b, p/s, p/seat, air cond., r/h, w/s/w, GMAC financed, take over \$112 mo. pymnts., \$3500. No. Hollywood, 764-7131. A
Stove, 1955 Kenmore, gas, grill, dble. oven & broiler, 4-hr. timer, \$90. Hawthorne, 675-7953. A
Autoette, elec. 6-battery, ideal for invalid or elderly person, \$100. Redondo Bch., 370-0250. A
Stove, 1952 Kenmore auto., 30" w/storage space, lights, clock & elec. plug, \$20. Hermosa Bch., OR 0-7935. A
MC-TF 1500, rebilt. eng., wire wheels, Pirelli Cinturato tires, wood chrome steering wheel & trans. radio, \$995. L.A., 657-3074. A
Truck & Camper, Dodge, \$2000. Redondo Bch., 379-9278. A
Cadillac, 1952, 4-dr., \$225. Inglewood, 754-7947. A
Broiler & toaster, Everhot portable, elec., \$5. Hawthorne, OS 6-0041. A
GTO, 1964, h/top, 4-spd., posi-traction, mags, gauges, r/h, \$2200. Inglewood, OR 1-1351. A
Chevrolet, 1955, Bel Aire Deluxe, 2-dr., V-8, 40,000 miles, orig. owner, \$450. Culver City, 838-1242. A
Honda S900, 1965, low miles, extras, \$300. Manhattan Bch., 379-4581. A
Stove, elec., Admiral, \$30. L.A., 475-4347. A
Stove, O'Keefe & Merritt, 35" wide, w/full size oven, \$45. Gardena, 327-2279. A
Accordion, 120 bass La Scala, model 7432 TD, white, 8 mos. old, \$400. Culver City, 836-4934, 871-0999. A
Own Your Own Apt, 1-bdrm, kitchen, bltins, lge. glassed-in Lanai, lge. patio & pool, FHA 4 1/2% mortgage, \$99 mo., including maintenance, \$15,000. Hollywood, HO 7-9201, HO 5-5314. A

For Sale
Volkswagen camper, Westphalia pack equipped, 1965, add'l. extras, 3000 act. miles, \$2850. Orange, 633-2258. A
Rambler American, 1958, less than 3000 miles on rebilt. eng., seat belts, smog device, \$275. Van Nuys, 787-8183. A
Lots, 2, Lake Isabella, \$1750 ea. or \$3200 for both. Gardena, 635-3127. A
Chevrolet, 1951, smog device, good tires, \$100. Gardena, 327-8047. A
Home, 2-story, lge. lot, close to school, Northrop & fwy., 2 full baths, bltins, 4 yrs. old, dble. gar., \$25,500 or \$200 mo. rent. San Pedro, 833-4749. A
Acreage, near Rosamond, in Antelope Valley, East Kern Water Agency dist., 2 1/2 to 10-acre parcels, \$595 acre. Torrance, FR 8-1026. A
Refrigerator, \$35. Torrance, 675-3836. A
Bar, knotty pine Salem finish, 4' lg. 1' wide, metal cooler, cutting board & foot rail, \$35. Inglewood, PL 6-6888. A
Vacuun, Kenmore Magicord, w/powermate attachment, 1 1/2-yr.-old, \$45. Hawthorne, 676-6122. A
Motorcycle, S-90 Honda, 2900 miles, 1965 model, \$325. Woodland Hills, DI 7-0303. A
Income Property, houses, 1 3-bdrm., 1 2-bdrm. & 2 duplexes on 1 lot, Inglewood area, my equity for \$1250, approx. \$52,000. Gardena, DA 9-3436. A
Ford station wagon, 1957, \$195. Manhattan Bch., 379-2649. A
Stove, Western Holly, gas, 36", w/broiler & griddle, \$25. Torrance, DA 9-3721. A
Bicycle, 20" boy's, Schwinn or Murray, \$12. P.V. Pen., FR 7-5853. A
Falcon Futura, 1964, 2-dr., 6-cyl., sedan, auto. trans., r/h, w/w tires, s/belts, 17,900 miles, \$1350. Hawthorne, OS 6-9175. A
Dining Room Set, Neva-mar, dropleaf table, 5 chairs upholstered, cocktail table w/center drwr., 2 matching end tables, wall shelf w/mirror, blonde, \$125. Hawthorne, 676-6625. A
Hi-Fi Speakers & enclosures, pr. 8", size 15" w x 11" d x 25" h., maple finish, handle 25 watts, \$25. Lakewood, ME 3-6346. A
Mercedes-Benz, 1965, 190D diesel, 4-dr. sedan, 30-42 mpg, fully equipped, r/h, w/w tires, \$600 for equity, \$3350. Ontario, 714-984-4660. A
House, 3-bdrm., bltins, burch cabinets, bltin TV/Hi-Fi area, raised fireplace, 500 sq. ft. playroom-workshop, 2 1/2 car gar., fruit trees, walking dist. to shops, 20% dn., \$27,250. Alhambra, AT 4-5698. A
NSU Prinz, 1959, \$150. Fullerton, 714-528-6914. A
Porsche conv. D., 1959, Michelin X tires, new paint, radio, \$1650. P.V. Pen., 377-4268. A
Wet Suit, Farmer John, size small, \$20. Torrance, 375-6071. A
House, 4-bdrm., 3-bath, dining rm. & den, all bltins, on ocean front, \$1750 dn., \$35,000. San Pedro, TE 3-2512. A
AM-FM phono, Hi-Fi console, walnut cabinet, Hoffman recvr., Girard changer, Jensen speakers, \$75. Torrance, DA 3-8797. A
Sailboat, 26' Thunderbird, complete set of sails, boat bath & cover, extras, \$5500. Hawthorne, 675-4329. A
Trailer, 18', sleeps 4, shower, stove, refrig., cooler, \$1400. Redondo Bch., FR 8-2609. A
Rugs, Oriental, 3, 3'x5', \$30 ea. L.A., 477-0610. A
Chevrolet, Bel Aire, 1958 V-8, 4-dr., r/h, new brakes, tires, p/s, dyno-tuned, \$400. Anaheim, 638-5364. A
Golf Bag, 3 woods, 5 irons, \$25. Long Bch., GE 4-3169. A
CB Transceiver, 2-way radio, exec. model 100, includes mobile antenna, crystals, 110V & 12V plugs, locking bracket, \$135. Torrance, 325-3724. A
Volvo, 1959, w/1961 eng., new headliner & paint, chrome rev. rims, record player, \$525. Lynwood, NE 1-9322. A
Truck, 1955 Ford, 1/2-ton, 6-cyl., w/Sportsman camper, custom cab & Hydromatic, mirrors & spot light, \$395. Hawthorne, 370-9238. A
Shotgun, 12 ga. Ithica, 28" modified barrel, 5-shot pump, \$65. Hawthorne, OS 6-3365. A
VW Conv., 1961, excel. mechanical condition, paint & uphol., \$950. Studio City, PO 3-1024. A
Piano, upright, \$70. Hawthorne, 679-2610. A
Pups, German shepherd, 10 wks. old, AKC reg., 2 males, 2 females, \$50. Hawthorne, 676-1441. A
Wheelchair, alum., demountable foot rests, \$25. L.A., AX 1-4523. A
Camera, 2 1/4 x 3 1/4 Crown Graphic w/101 mm Kodak Ektar & 200 mm Graphlex Tele-Optar lenses, Kalart range-finder, 2 roll film back attachments, \$125. Rolling Hills, FR 7-1732. A
Piano, upright, antique finish, \$100. Hawthorne, OS 5-7740. A
House, 2-bdrm., 160 x 55 lot, R-2, loan comit. \$13,600, \$16,000. Lynwood, 639-2398. A
House, 2400 sq. ft., fence, 4-bdrm., 2 1/2 bath, 2-car gar., 2 story, wood panel dining, concrete patio, \$39,000. Buena Pk., UN 3-2769. A
Range, elec., Westinghouse, coppertone 4-burner, auto. controls, 1 1/2 yrs. old, \$100. Gardena, 324-0274. A
Chevrolet Biscayne, 1961, 6-cyl., auto. trans., r/h, \$650. Inglewood, 678-1621. A
VW 1200, 1965, radio, s/belts, sway compensator, bumper stiffeners, w/w tires, 11,000 miles, \$1550. Hawthorne, 675-1366. A
Dryer, General Electric, 8 yrs. old, needs work, \$15. P.V. Pen., FR 8-1863. A

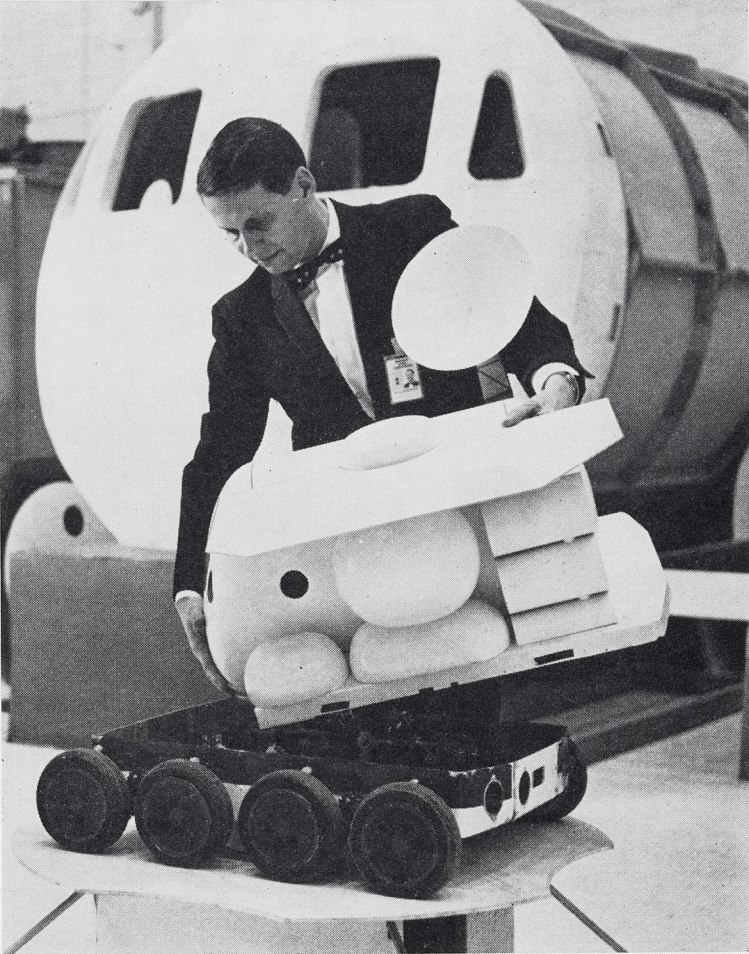
For Sale
House, 2-bdrm., landscaped yard, 2-car gar., redwood patio, \$19,950. Hawthorne, OS 9-7674. A
Volkswagen, 1966, 1600 fastback, 44 actual miles, \$2300. L.A., 473-2585. A
Go-Cart Chassis, all welded steel, Ackerman steering, \$20. Anaheim, 774-2779. A
Oldsmobile, 1966, 6500 miles, mag wheels, vibrasonic radio, 4-spd., b/seats, \$2850. Brea, 529-6789. A
Acreage, 5 acres, San Jacinto-Hemet area, \$6000 dn., \$17,500. Lennox, 675-7621, DA 6-9267. A
Ford Futura, 1961, orig. owner, w/w tires, auto. trans., r/h, \$950. Inglewood, 672-6779. A
Bedroom Set, dble. size, mattress & box spring w/frame, bookcase headboard, matching blonde 6-dwr. dresser, \$85. Lakewood, ME 0-3888. A
GTO, 1964 389 cu. in. w/posi-traction, chrome rims, \$2200. Torrance 378-5924. A
Austin Healey 3000, 1960, hard & soft top, low mileage, \$1095. Manhattan Bch., 379-3826. A
Cabin Cruiser, 32' Hunter sedan, 115 hp Chrysler Crown, sleeps 6, radio, d/f, autopilot, dinghy, full covers, \$6100. San Pedro, TE 3-8903. A
Horse, reg. thoroughbred, gelding, 5 yrs. old, \$475. P.V., 377-7361. A
Honda, 1966 Super 90, extras, 1700 miles, \$325. Downey, TO 2-0656. A
Volkswagen, 1958, r/h, w/w tires, orig. paint, \$645. P.V. Pen., 377-4585. A
Dodge Dart GT, 1963, r/h, w/w, tint windshield, 2 extra tires, \$1200. Santa Monica, 394-3004. A

Wanted to Buy
Player Piano, reasonable condition. Redondo Bch., FR 2-8254. B
Couch in good condition for under \$50. Torrance, 328-3492. B
Analyzer & pistol timing light, Sears automotive-type, must be reasonable. Torrance, DA 6-5558. B
Unicycles, for boy's 8 & 12 yrs. old. Torrance, 325-3548. B
Rifle .270 cal. with or without scope. Torrance, FR 5-8804. B

Rentals Offered
Cabin, Green Valley Lake, \$35 weekend, \$60 wk. Torrance, 320-2002. E
Apt, 1-bdrm., bltins, pool, \$95 mo. Redondo Bch., 376-2117. E
Apt, 2-bdrm., bltins, closed gar., large closets, near Northrop, \$100 mo. Inglewood, PL 4-0351. E
House, 3-bdrm., 2-bath, dble. gar., \$175 mo. Torrance, 371-5694. E
Apt, 1-bdrm., bltin stove, closed gar., laundry facilities, \$89 mo. Gardena, 328-6955. E
House, small, partly furn., water paid, \$57.50 mo. L.A., PL 9-4391. E
Cabin, Idylwild, sleeps 4-6, \$22 weekend, \$55 wk. L.A., PL 4-5288. E
Apt, deluxe 2-bdrm., unfurn., lge. pool & patio, bltins, closed gar., near El Camino, \$115. Torrance, DA 9-5986. E
Apt, 1-bdrm., unfurn., bltins, pvt. patio, closed gar., hobby shop, hot water & trash pd., \$95 mo. Torrance, FR 5-0867. E
Vacation Cabins, Lake Gregory & Crestline, make reservations early for May thru Sept., \$25 weekends, \$60 wk. Venice, EX 1-2040. E
Apt Townhouse, new, view, 4-bdrm. or 3 & den, heated pool, entertainment pavilion, 2 1/2 bath, living rm., \$295 mo. Rolling Hills Ests., DA 5-5609. E
Apt., 1-bdrm., disposal, bltins, carport, 1 1/2 blocks from Northrop, \$95 unfurn.; \$110 furn. Lawndale, OS 6-5425. E
House, 2-bdrm., stucco, h/wood floors, tile kitchen & bath, near Northrop, \$105 mo. Hawthorne, 644-2002. E
Apt., furn., lge. single, 2 blocks from Norair, \$90 incl. utilities. Hawthorne, 675-8170. E
Home, 3-bdrm., 1-bath, No. Redondo area, lge. fenced yard, patio, play area, convenient to shopping & schools, 1 or 2 children OK, avail. May 1, \$120 mo. Redondo Bch., 379-6824. E
Apt., 2-bdrm., bltins, 2 children, play yard, fenced, \$100. Torrance, 320-2827. E

FOURSOME
(Continued from page 2)

and its people in a short period of time," Mr. Peck said. "They really know the country and its people."
"Wherever these men went, we went, sharing everything," Mr. Lohry said. "I especially enjoyed a chance to chat with Mr. Jones and to know we share a lot of common goals—the best possible aircraft, on schedule and within costs. We each have a specific job to perform to make it possible. After what I saw and heard, I am really proud to know I am working for a winner."
Upon his return from Norway, Mr. Jones offered the following comments:
"We could not have selected more outstanding men to represent us than Messrs. Lohry, Minoletti, Peck and Rogers. They conducted themselves with natural dignity. Their discussions involving the F-5 indicate an intimate



QUICK SWITCH—Although not as easily as this, lunar vehicle including suspension developed by Bill Sponsler of NSL could find military application on earth. In background is full scale mockup of lunar vehicle.

Rentals Offered
Apt., 1-bdrm., furn., bltins, pvt. deck, lge. pool, sub. parking, near Northrop, \$137.50 mo. Lawndale, 670-6084, 679-2117. E
Personals
On behalf of the Leroy Fain family, I would like to thank everyone for their assistance & kindness during our recent bereavement. BONNIE FAIN. L
I wish to thank my many friends at Northrop for their kind expressions at the loss of my mother. PEGGY WOOD. L
My family & I would like to express our deep gratitude to our many Northrop friends for their thoughtfulness & consideration at the passing of my mother. MARY MCKAY & FAMILY. L
For Sale or Trade
Studebaker, 1961 Lark, \$550 or trade for piano. Hermosa Bch., FR 9-7342. M
Relax-A-Cizor, cost \$400, \$200 or trade for TV. Inglewood, 674-1730. M
Plymouth, 1947 deluxe, good mech. cond., new upholstery, convt. floor shift, \$125 or trade for mina bike. Box 704. M
Photo Darkroom Equip., enlarger, trays, tank plus many extras, \$100 or trade for good portable tape recorder. Box 705. M
Tape Recorder, VM Mod. 714, 2-spd. dual track, \$45 or trade for Colt, .22 cal., or Hi Standard pistol or rifle, .22 cal. pump or lever, preferably with scope. Box 706. M
Mustang, 1965 h/top, V-8, 289 cu. in., 4-spd. trans., p/s, extras, 8500 miles, \$2400 or trade for late model pickup. Torrance, 320-0210. M
Going my way?
Rides Wanted
8 a.m. — 4:45 p.m.
Orange & Del Amo, Long Beach. W. H. Covert, NSL, ext. 2721, GA 3-1363. 5
Rides Offered
8 a.m. — 4:45 p.m.
Orange & Del Amo, Long Beach. W. H. Covert, NSL, ext. 2721, GA 3-1363. 15

AD ASTRA
(Continued from page 3)

activities; J. J. Riordan, director, Quality and Reliability Assurance, Office of Assistant Secretary of Defense, Installations and Logistics; Colonel C. R. Silliman, chief, Technical Requirements and Standards Office, (SSS); and Captain F. J. Heiler, officer-in-charge, U.S. Naval Fleet Missiles Systems Analysis and Evaluation Group, Naval Ordnance Laboratory.
Workshop sessions and a panel discussion led by representatives of the Army, Navy and Air Force IDEP offices and Contractor Advisory board members will also be featured at the conference.
knowledge of all systems. When we have winners among our products, as the F-5 obviously is, it is due largely to men such as these. They make us all proud."

New Safety Committees Appointed

Members of three Northrop Ventura safety committees operating to protect the well-being of employees while at work have been announced by H. E. Riggin, jr., vice president and assistant general manager.

The three groups are the general, supervisor's and workman's safety committees, which share responsibility for safety programs.

The workman's committee has initial responsibility for maintaining safety standards in all areas on company property. They check regularly throughout the plant and report any needed corrections.

The supervisor's committee works closely with the workman's group, assisting to obtain results where greater coordination is required than is available to the workman's committee.

The general committee establishes safety policies and broad programs. Where safety problems cannot be remedied by the supervisor's or workman's committees, the general committee may take remedial action.

Members of the general safety committee are: Robert W. Young, chairman, A. P. Binsacca, L. B. Carroll, Phillip I. Chase, John E. Evans, Rex Fairless, Charles K. Simmers, and Steven J. Wrubel.

The supervisor's safety committee consists of: Carl F. Emerich, chairman, Clyde W. Corder, Elinor Eckels, Dale (Buck) Gilmore, Al H. Martin and John P. Steman.

Members of the workman's committee are: Harry McLaughlin, chairman, Nelly Cook, Edward J. Fink, Thomas F. Hunter, Leo E. Priddy, Richard W. Ruth and Francis L. Hicks.

Nortronics Awarded New Hawk Business

Northrop has received a letter of intent from Raytheon Company, Lexington, Massachusetts, to purchase for an amount in excess of \$5 million missile ground handling equipment and airframe components for Hawk surface-to-air missile systems, to be supplied by Raytheon to the government of Saudi Arabia.

The Hawk systems are being purchased by Saudi Arabia, in accordance with U.S. State Department policy, as part of its new, modern air defense system.

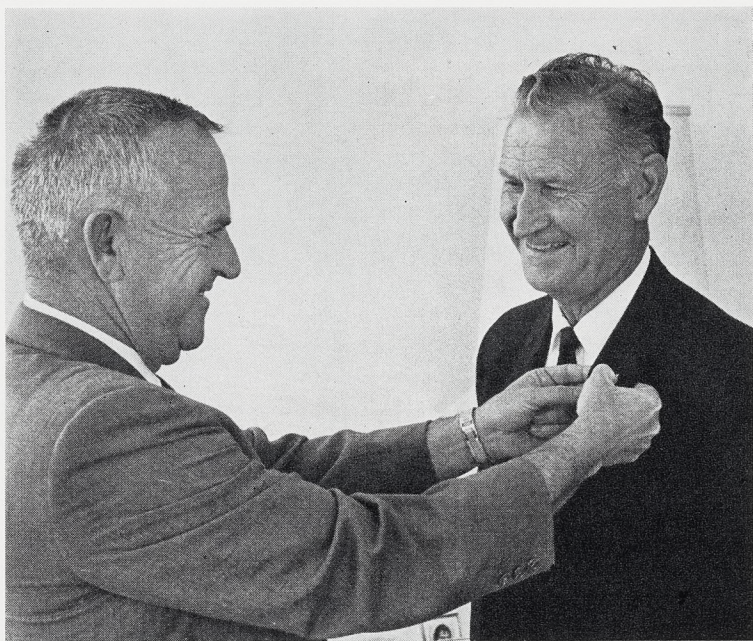
Manufacture of airframes, launchers, loaders, missile wings, elevons and hydraulic actuators for the missile system is centered at Nortronics Anaheim. Production of these items is expected to span a period of approximately 14 months.

The Hawk is a radar-guided missile for use in protection against both medium-to-high and low-flying aircraft.

Qualification Testing Film to Be Shown

The NASA motion picture "A Year of Qualification Testing" will be shown continuously in the Northrop Ventura Administration building Assembly Room from 11:20 a.m. to 1 p.m. next Wednesday.

The film, 21 minutes long, covers testing activities for various NASA space programs,



RECOGNITION FOR SERVICE—Don Wylie (right) receives three-diamond service pin from George Douglas, general manager, on completion of his 25th year.

MARS: Landing System Study Compares Parachute Performance

(Continued from page 1)

Figurations, however, show even greater promise for the Mars landing problem. One is the Cloverleaf, a three-lobed parachute which has a glide ratio of two to one and could offset some of the surface wind velocity. The other is an annular parachute which has up to 80 percent of its center area removed. This configuration offers high drag and great stability.

As visualized in the Northrop studies, a 1500-pound vehicle could be landed on Mars at 80 fps with any one of the three

major configurations. Weight of the landing system would range from 112 to 225 pounds, the main parachute diameter from 120 to 164 feet, and the stowage space required would vary from 1.6 to 3.3 cubic feet.

The Northrop studies, as described by Mr. Worth, indicate that a two-stage parachute system probably would be most satisfactory to allow a number of minutes time for measurements while the vehicle is descending through the Mars atmosphere.

In operation, a drogue parachute would be deployed after the Voyager vehicle has entered the Martian atmosphere and slowed the vehicle to a velocity somewhat above the speed of sound. Deployment of the drogue also would jettison the forward heat shield, thus reducing the weight of the final landing vehicle. The main parachute would be deployed at from 5000 to 20,000 feet altitude, depending upon requirements, and would disconnect at the moment of impact on the Martian surface.

Mr. Worth stressed that a comprehensive test program must be conducted at Earth altitudes above 100,000 feet before a final and satisfactory landing system may be designed.

LETTERS

(Continued from page 1)

His request was for information on the Apollo Earth Landing System.

Writing from Holland in English a boy of 16 and an adult office administrator both wanted details on space.

The boy, a resident of Zwolle was interested in photos of the Apollo landing system.

The young man in an office in Harlem sought detailed material on the Northrop Corporation role in the space effort. Evidently familiar with the Ventura Division's work, he also asked for information on corporate programs in support of manned and unmanned space exploration.

Briefest of the letters arrived from Oklahoma City, Oklahoma: "I would like to know what your company is doing for the space program. Thank you very much."

CLOVERLEAF

(Continued from page 1)

Both test vehicles contain instrumentation to measure glide angle, glide ratio, control line travel and force, and turn rate.

Part of the design is a device which bypasses the control line forces from the control mechanism during parachute deployment.

This is accomplished by means of a jumper on control lines which is attached to a pyrotechnic release fitting. After full deployment is achieved the pyrotechnics are fired, releasing the jumper, and transferring the control line forces to the control mechanism.

To prevent damage to the instrumentation on landing, crushable styrofoam blocks are placed between the guidance and control box and the landing skids.

NVRC ROUNDUP

Sportsman Mix Plaudits, Puns at Awards Dinner

By CLIFFORD R. PRODGER
Rod and Gun Club Member

The Northrop Ventura Rod and Gun Club recently recognized outstanding performance as well as the doubtful activities, frightful conduct and general inattention to detail of its more prominent sportsmen and women at an annual awards dinner held at the Chatsworth Center, Chatsworth, March 12.

Top honors in fishing and in scatter gun competition are awarded each year on an annual point system. The club's highest award, "Club Champion Shooting and High Annual Points," was accorded Earl Muehlenbach. "Club Champion, Fishing Category," a twin award for the fishing contingent was won by Earl Morgan, a fresh and salt water angler as well as hunter.

Receiving a trophy uncoveted by deep sea anglers was Les Hudson, the club's "Chief Chummer." Mr. Hudson was outstanding for his seagoing chartreuse complexion and a willingness to share breakfast with the fish, plus courage in the face of obvious odds.

Joe Woods, distinguished by ownership of a rifle scope of great magnification, received the trophy for the "Year's Largest Fawn."

A special award for "perseverance" was presented to Chuck Simmers, winner of the club's three hunting trips to Utah. Consistency was also mentioned: eight years of hunting and no deer.

"Top Lady Gun," a serious award, was won by Diane Livingston. Miss Livingston was noted for her shooting ability in addition to her value in distracting the competition.

Doug Finch received a trophy for landing a "99 pound sailfish" in La Paz waters, Mexico.

High point man for the year in "Trap Shooting" was Jack Bean.

"Top Lady Fisherman" trophy for the year, one of the club's

coveted awards, was won by Vera Bailie.

"Fresh Water Fishing" trophy was won by Vince Bailie, hard pressed for the honor by his wife, the top lady fisherman.

Winner of the "Salt Water Fishing" category for 1965 was Karl Stoy, whose capability in cornering albacore was inescapable.

The Northrop Ventura Rod and Gun Club participates as a member of the Southwest Anglers Association, which provides button awards for trophy fish and game.

Button awards were won by the following members:

Trap, 25 straight, George Conley; albacore, 25 lb. 8 oz., Elston Segar; Trap, 25 straight, Jack Bean; bluegill, 1 lb., Marilyn Lawrason and Vera Bailie; Skeet, 25 straight, Earl Muehlenbach.

John Lawrence, a past president of the club, was honored for his consistent excellence in hunting over the years. The honor suffered slightly from dilution when it was also pointed out that the deer he bagged in 1965 might better have qualified for a button award in the jackrabbit classification.

Dinner was cooked and served by a committee of club members headed by Flo Johnson.

* * *

Summer Bowlers Begin Signing Up

Signups for two bowling summer leagues have opened at Northrop Ventura, Zack Silvers, bowling commissioner, reported this week.

The leagues will start in May at Camarillo Bowl, Camarillo, 6:30 p.m. Wednesdays and Rocket Bowl, Canoga Park, 6:30 p.m. Fridays.

Mr. Silvers pointed out that bowlers in the Thousand Oaks-Ventura-Conejo area have a chance to start fresh for the summer season by joining the Camarillo Wednesday night sessions.

"West Valley bowlers have the same opportunity at Canoga Park," he said.

Additional information on the summer leagues is available from the commissioner at extension 537.

* * *

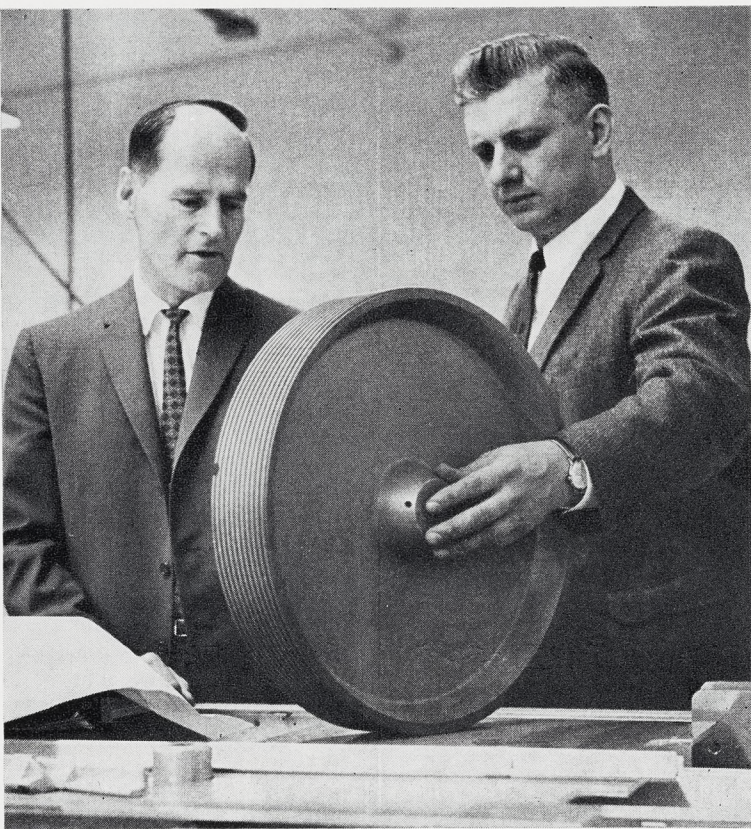
Tennis Club Opens Season Under Lights

Tennis players at Northrop Ventura opened their season March 23 at Balboa Courts, Balboa and the Ventura Freeway in the San Fernando Valley, playing during the evening under the lights.

Commissioner George Brundage of the Golf Club reports a good turnout.

The club meets each Wednesday evening during good weather, with play open to both employees in the division and their older children. Instruction is available.

This year, information on tennis and instructional material will be sent to club members periodically, Mr. Brundage indicated. Additional information on the club may be obtained from him at extension 227.



SHOCK PROTECTION—Vince Riley (left) and Larry T. Parson look at hardware that will go into latest cloverleaf parachute test vehicle at Northrop Ventura. "Wheel" is actually reel which holds parachute lines, keeps them from transmitting opening shock to delicate instruments. Reel rests on vehicle frame, other components.

NORTHROP NEWS

NORTHROP VENTURA

Published biweekly by Northrop Corporation, Beverly Hills, California

Vol. 24, No. 8

April 27, 1966

Turkish F-5's Unveiled at Ceremonies

Official ceremonies marking receipt of Turkey's first squadron of Northrop F-5 tactical fighters were held earlier this month at Esenboga Airport in Ankara, with more than 3000 persons attending.

General Bruce K. Holloway, commander-in-chief of U.S. Air Forces in Europe (USAFE), turned the 1000-mile-per-hour aircraft over to General Irfan Tansel, commander of the Turkish Air Force.

Initial delivery of F-5's to Turkey took place just before the end of 1965, but official ceremonies were not held until now.

Terming the acquisition of the F-5 by Turkey as "another significant step in the modernization of your Air Force," General Holloway said:

"Your acceptance of these aircraft shows the mutual trust and confidence enjoyed by two countries whose efforts are joined to assure attainment of mutual security."

The USAFE commander praised the facilities at Bandirma Air Base prepared to support the F-5, and noted that pilots for the first squadron of F-5's have completed the first phase of their transition training. Plans are under way to accelerate training for the second squadron.

General Tansel, speaking for the Turkish Air Force, told those present:

"It is a great pleasure for me to accept these F-5's from our great friend and ally, the United States . . . With the F-5's simplicity in operation and maintenance, plus its capability of operating from sod fields, it will add considerably to the strength of our air force."

Among those present for the ceremonies were U.S. Ambassador to Turkey Parker T. Hart; Major General Benjamin F. Evans, chief of the Joint U.S.

(See **TURKEY**, page 6)

STUDENTS ON TOUR



Santa Paula Union High School English students view electronic coil winder under guidance of Glen Estes during

tour of Northrop Ventura. Device produces electronic coils which magnetically move control surfaces of RP-76 drones.

Seventeen Receive Service Awards

Four women and thirteen men at Northrop Ventura are celebrating their length of service anniversaries this month.

Stiles Burke, Robert Hutton, Richard Snohr and Glenn Westcott have completed 15 years at Northrop and received service pins.

Ten year pins were presented to Edward Lewis, Audrey Gore, James Conlan, Wade Tilley, Leo Smithson, John Krieger, Milan Dobrich, Jack Landis, Ray B. Bourland, Ruth Weiss, Jacob Davis, Katherine Reiss and Lena Recchia.

Carolina's Solid Rocket 'Throttles' Like an Auto

A contract for design, development and testing of a controllable solid-propellant rocket to power the U.S. Air Force Advanced Ballistic Reentry System (ABRES) has been awarded Northrop Carolina by Aeronutronic Division of Philco Corporation.

Under development for three years by Northrop's wholly-owned subsidiary headquartered in Asheville, North Carolina, the Free World's first controllable solid rocket (CSR) has already been fired successfully more than 225 times.

Prior to the Northrop development, there was no stop and restart in solid rockets. The fact that the CSR can be "throttled" just like an airplane or an automobile engine, offers great promise for space applications and in

low-gravity takeoff situations, such as on the moon.

The ABRES propulsion unit will be a CSR modified to provide precise attitude control simultaneously with periodic "pulse" firings through its main nozzle. The attitude control feature also provides control of roll, pitch and yaw.

"We have established beyond any doubt the feasibility of throttling over a wide range of thrust and of stopping and restarting an

(See **CAROLINA**, page 6)

Fiberglass Parts Work Increasing

Production of all fiberglass parts for the Northrop F-5 and T-38 will be performed by Northrop Ventura, an increase from the present 40 percent of plastic parts, M. A. Maurer, vice president and manager, Production Operations, has announced.

Ducts, covers, shields and inverted-flight fuel cells are currently manufactured at the Ventura Division. The increased effort will include foam plastic antenna tips, manifold assemblies, and additional ducting, covers and shields.

Go-ahead for transfer of the plastics work was given on April 11. By the end of the month, 39 more parts for the two Northrop jet aircraft will be in production at Ventura.

Plastic fabrication in support of the T-38 trainer began in 1962. Before that, as far back as 1954, the Division operated a Plastics Experimental Fabrication shop involved in research and development production of drone parts.

Current work includes parts for Northrop drones and those of other companies.

Headed by Harry McLaughlin, foreman, the present Plastic Products branch is increasing its personnel from 40 to 60. Three compression molding presses and a curing oven will be moved from Norair to augment production capabilities.

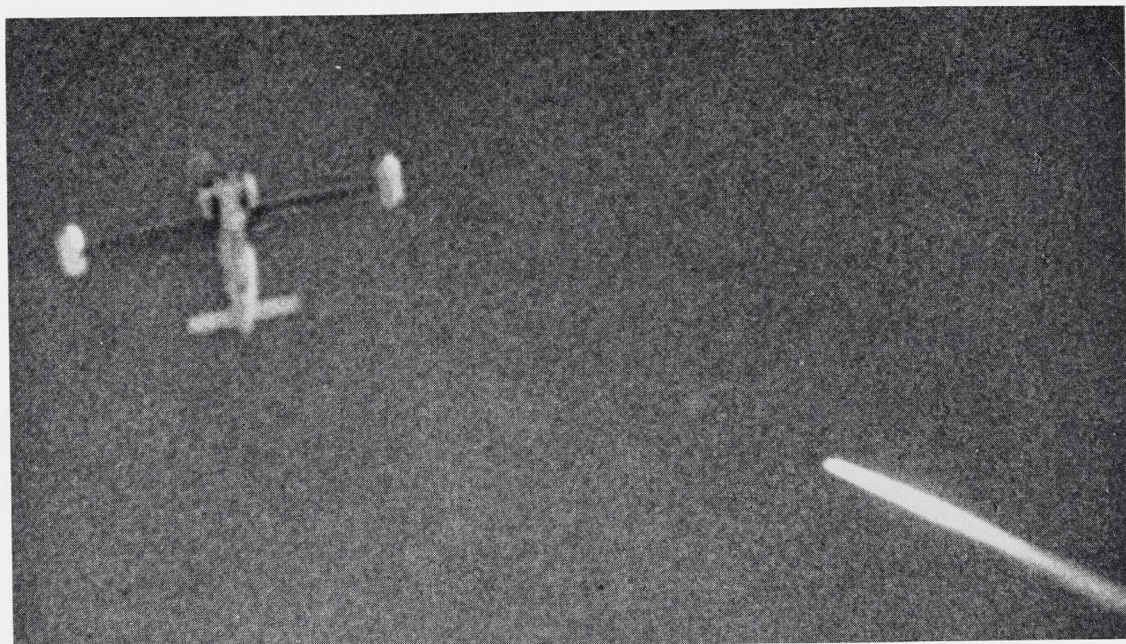
Present shop equipment includes 13 presses and two ovens.

"Our production capabilities in support of the T-38 and F-5 will almost double," Mr. McLaughlin said. "We are augmenting our plastics oven curing capability by at least 100 percent and providing a capability for manufacturing larger parts."

Seven Ventura Plastic Products employees have begun a program of additional training at

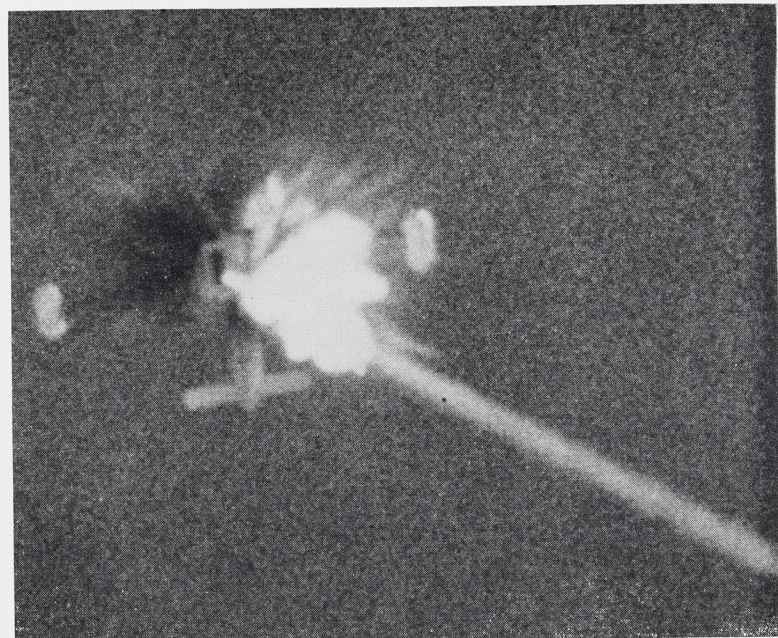
(See **FIBERGLASS**, page 6)

REDEYE SCORES BULLSEYE ON NORTHROP DRONE



Some Northrop Ventura drones fly again and again after use as targets for gunfire. But this

six-cylinder KD2R-5 (improved) met destruction on first mission. Army's shoulder-fired anti-



aircraft missile, the Redeye, is shown homing in from right (left photo) and striking drone

(right photo) as both disintegrate. Photos continued on page 6.

FRINGE BENEFITS

Group Insurance Today: Northrop Provides Medicare Plus



By WILLIAM LARRABEE
Vice President—Industrial Relations

In an effort to clear up a lot of details before going away on a trip, I missed the deadline for an article in the last issue of the Northrop News.

After a great deal of discussion, we have decided upon the group insurance changes which I mentioned before and which will go into effect when Medicare starts on July 1. This was not an easy task. We wanted to get the best possible coverage for the money which would do the most good for Northrop people. There will be an announcement in our various plants before this article is published. Nonetheless, it might be well to go over some of the points briefly:

1. We have quite a number of active employees who work past the age of 65. These folks will get the same group medical benefits that any active employee now has, *except that* the Northrop policies will not cover anything provided by Medicare. These people must register for Medicare, therefore, or they will not have full coverage. Northrop pays the full expense for this Northrop benefit and will reimburse the employee for the \$3 monthly which he pays for the Medicare coverage. There will, therefore, be no cost to the employee.

2. Quite a number of active Northrop employees have dependents over 65. If the employee is carrying dependents medical coverage it will be continued just as before, *except that, again,* it will not cover anything reimbursed by Medicare. The employee's contribution for dependent coverage will be reduced by \$3 per month so that his dependent over 65 can be enrolled in Medicare without additional cost to him.

3. We recently put in our fine "Magic 85" formula and increased our benefits for people retiring between the ages of 55 and 65. These people who retire early cannot get Medicare until they reach 65. They must have good protection, however, in the meantime. A new Major Medical policy has been worked out for them which gives coverage up to \$5000 between retirement date and age 65 when Medicare becomes available. The retiree contributes \$4.67 per month for this policy and the company contributes \$4.67.

4. Lots of retirees have dependents under 65 who can't get Medicare either. The retired employee will be able to get coverage for these dependents under age 65 on the same basis as that available to retired employees under age 65 as described in paragraph 3 above. The retiree will contribute \$4.67 per month for the

covered dependent and the company will contribute \$4.67.

5. All of our retired employees over 65 will have Medicare available to them. It took us a long time to decide what medical insurance we really need at that age over and above the Medicare protection. It became pretty obvious as we sifted through everything that the expenses which hurt the most at that age are those for prescription drugs and special nurses. There will be a policy available for retired employees over 65 covering these two items up to \$5000. A retired employee who wishes this policy will contribute \$1.25 per month and the company will contribute \$3 per month.

6. Lots of retirees have dependents who are over 65 and who have Medicare available to them. The same policy (see paragraph 5 above) will be made available to retired employees for their dependents over age 65 as is available for retired employees over age 65.

7. Retiree benefits and retiree dependency benefits specified above are available to those retirees participating in the Northrop Group Medical program as of July 1, 1966 and to those personnel retiring after that date provided, of course, that eligible personnel enroll in accordance with company regulations.

One very important thing should be remembered in connection with all of these benefits. The Group Insurance Administration people plan to be in touch with each person affected by these changes not later than the middle of May. They may have some problems, however. For instance, the company does not know what eligible dependents are over or under 65 in many cases. To be safe, if you have not heard from the Group Insurance Administration office before the 1st of June, be sure to contact William Waldon at the Norair facility, extension 1210. The Group Insurance people will inform you as to policy details such as deductibles, accumulation periods, etc., and will answer any questions you may have.

On an entirely different subject, I would like to talk a little bit about United States Series E Savings Bonds. It is hard to even discuss savings right at the present time when we have all been hit so hard by all kinds of expenses. The first thing that jolted us was that most of us had to put up an additional \$100 this year for Social Security including Medicare. Of course, the company had to put up \$100 for each of us as well.

The next thing that came along was the increase in income tax deductions. As we all (See FRINGE BENEFITS, page 5)

CHAMBER PLANS ANNUAL VISIT TO NORTHROP MAY 4

The annual Hawthorne Chamber of Commerce Day at Northrop will be observed May 4.

This event, which brings top community leaders to call on Northrop, has become a traditional one in which both Norair and Nortronics Divisions participate.

It features tours of production areas, product displays and talks by key Northrop officials.

Tentatively scheduled to participate this year are such leaders as R. R. Miller, Northrop senior vice president—Corporate Relations; R. E. Horner, Northrop senior vice president and Norair general manager; Northrop Norair vice presidents Roy Jackson (NSL), Welko Gasich (Technical) and F. W. Lloyd (Operations); and Ross Miller, Nortronics vice president and Technical manager.

T. L. McCarthy, Norair manager of Administration, will serve as master of ceremonies.

Few Tickets Remain For 'Dr. Zhivago'

A few tickets still remain for an all-Northrop theatre party to see Dr. Zhivago, winner of five Academy Awards, May 15 (8 p.m.) at the Hollywood Paramount Theatre.

Regular \$3.50 loge and \$3 orchestra tickets are available for \$3 and \$2.55 respectively, through NRC sponsorship. Validated parking is 50 cents.

Tickets may be obtained from all Northrop ticket outlets.

Disneyland Tickets On Sale at Outlets

Tickets for an all-Northrop night at Disneyland May 27 (8 p.m. to 2 a.m.) remain on sale at all Northrop ticket outlets. Total price of \$3.95 entitles holder to unlimited use of facilities, plus general admission.



Edward T. Shedlock, president of AID-United Givers, presents check to Crippled Children's Society "poster boy," Billy John. The Society will receive more than \$107,000 from AID this year and is one of 12 participating causes to which AID distributes funds. Northrop's contributions to AID recently topped \$2.5 million for a 10-year period.

Land Investment Lectures Planned

A unique series of lectures covering real estate investments will be presented at NRC Clubhouse, Hawthorne, for an eight-week period beginning May 17.

Open to all Northrop employees and their spouses, the series will meet each Tuesday (5 to 7 p.m.). The cost is a nominal \$10 for an individual or \$15 for a couple.

Scheduled to appear as guest lecturers are experienced and prominent leaders in all phases of real estate investment. They will cover such topics as general investing, tailoring a program to individual needs, factors influencing land values, land development, tax relationships, hazards and advantages of partnerships and joint ventures, and private, commercial and business property investments.

Printed notes covering each lecture will be distributed.

Reservations will be limited to the seating capacity of the NRC Clubhouse and are presently being accepted at Personnel Activities office at Northrop Norair only.

This is the first program of its type ever arranged by the Northrop Recreation Club.

ANNUAL COMPETITION

Eight Merit Scholarships Awarded at Six Locations

Six sons and two daughters of Northrop employees have been named winners of 1966 Northrop Corporation Merit Scholarships in the National Merit Scholarship Corporation's 11th annual competition.

Each will receive from \$1000 to \$6000, depending upon individual need, to cover four years of undergraduate study at the college of their choice.

Northrop's Merit Scholars for 1966 are currently enrolled in their final year of high school.

They are:

Carson E. Agnew, son of George E. Agnew, a Northrop Norair aeronautical engineer. Now studying at Webb School of California, young Mr. Agnew plans to enter Massachusetts Institute of Technology to study aerospace engineering.

William C. Ellet III, son of Dr. William C. Ellet Jr., Northrop Corporate director of Market Research and Analysis. After graduation from Palos Verdes High School, Mr. Ellet hopes to enter the University of Chicago and study

liberal arts.

Jerry Gechter, son of Bernard J. Gechter, a Northrop Norair mathematician. Mr. Gechter expects to enroll at Harvard to major in physics upon graduation from Palisades High School.

Roger L. Hudson, son of Leslie E. Hudson, Northrop Ventura director of Contract Accounting. Now attending Cleveland High School, Mr. Hudson expects to enter UCLA to study law.

Marlene Price, daughter of Richard Price of Page Communications Engineers, Inc., Electronics group. Now attending Punahou School, Honolulu, Miss Price hopes to enter Sarah Lawrence to major in languages.

Loftin E. Elvey Jr., son of Loftin E. Elvey, manager of Information Systems and Data Processing at Nortronics' Precision Products department. After finishing Norwood senior high school, Mr. Elvey expects to study mathematics at Harvard.

James B. Chapman, son of E. Blair Chapman, Northrop Ventura shop foreman. Columbia for a major in political

science is Mr. Chapman's aim following graduation from James Monroe High School.

Susan J. Rothstein, daughter of Dr. Lewis R. Rothstein, manager of Munitions and Chemical Manufacturing Operations at Northrop Carolina. Miss Rothstein hopes to matriculate at Duke University to major in English after completing high school at Lee H. Edwards High School.

In winning 1966 Merit Scholarships, the Northrop youngsters join a select group of 2250 other winners across the nation who were selected by the National Merit Scholarship Corporation from a field of more than 14,000 finalists.

Northrop scholars began their quest for their current status by taking qualifying examinations in their junior year in high school, then college aptitude tests in their senior year. Skilled evaluators drawn largely from college admissions fields conducted judging. Considered were such factors as grades, accomplishments outside the classroom,

extracurricular activities and school recommendations as well as test scores.

Northrop began participating in the National Merit Scholarship program in 1959.

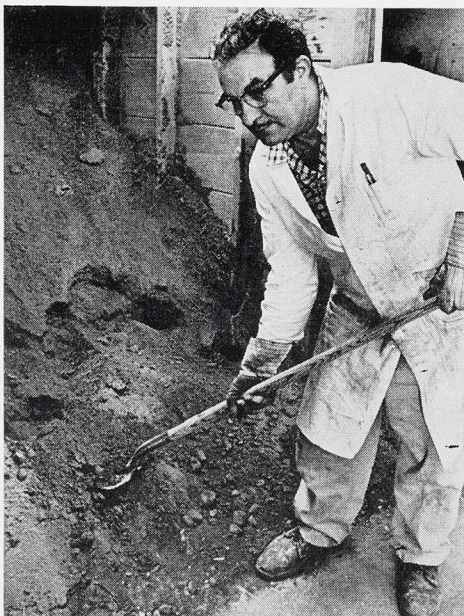
Currently, 12 Northrop sons and daughters are enrolled in college studying under Northrop Merit Scholarships. They are Donna L. Daley, Barry K. Rosen, Seth R. Alpert, Robert D. Campbell, Lance Bertelsen, Douglas A. Cook, Alice L. Cordell, Robert W. Dedon, Paul M. Glassco, Nicholas D. Humez, Robert P. McMahon and Gary J. Turnbull.

In addition to individual grants to winning scholars, Northrop makes an additional outright educational grant to the college selected by Northrop Merit Scholars.

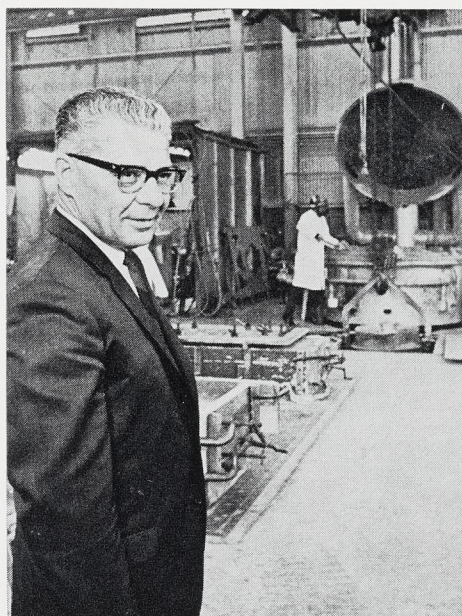
National Merit Scholarships are a part of an extensive Aid to Higher Education program followed by Northrop Corporation. It also includes restricted and unrestricted grants to various colleges and universities across the United States.



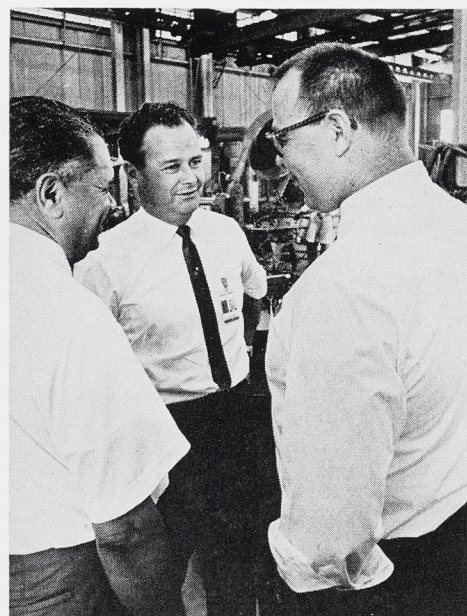
This humble beginning is basis for forming aircraft parts. Contour shaping of dies, as performed by Mel Sechrist, is one of the jobs in the Foundry which require a "feel" for task.



Sand is used by Foundry shop as base for hot metal while it's hardening. "Sand gets better care than most people's lawns," as Ed DeBennett (above) can tell you.



Russ Smith, superintendent of Tool Design and Fabrication branch, of which Foundry shop is a part, drops by for a visit. He reports to Lou Morgan, chief of Tool Engineering.



Duke Ozenne, Foundry shop foreman; Bert Osterberg of Tool Engineering Services; and Frank Rosenstiel, general foreman of Templates and Form Tools shop, discuss upcoming projects.

BY MEN WHO KNOW HOW

The Die Is Cast...Again and Again

It isn't known yet whether Ercel Oliver will develop some kind of complex, but it must be disturbing at times to have been the newest member of an organization for fourteen and a half years.

He's a mold maker in Northrop Norair's Foundry group, which must hold the company record for number of years service per pound. Seniority of the nine-man group averages nearly 20 years.

"We refer to the boys as the 'old masters,'" says Foreman Duke Ozenne, himself a 19-year veteran. "It's not the kind of job you can train people for. It requires a high degree of craftsmanship and a 'feel' for the job which comes only through long experience."

At the head of the seniority parade are Stan

Micek and Lester Cure, who started their Northrop careers in 1941. A year later Ernest Robinson and Melvin Sechrist came along. Hubert Hoppen with 18 years; Wilburn Wells with 17; Edward DeBennett with 16; and Lester Morr with 15, round out the group.

More amazing yet, all of the men but two have been in the Foundry shop the entire time. Of the two exceptions, Mr. DeBennett was out of the shop for only one and a half years, and Mr. Wells was out two years.

It comes as a surprise to a lot of people that Northrop even has a foundry.

(The NORTHROP NEWS can vouch for this, since its reporter asked directions from more than a dozen people without success, and finally stumbled upon it by accident).

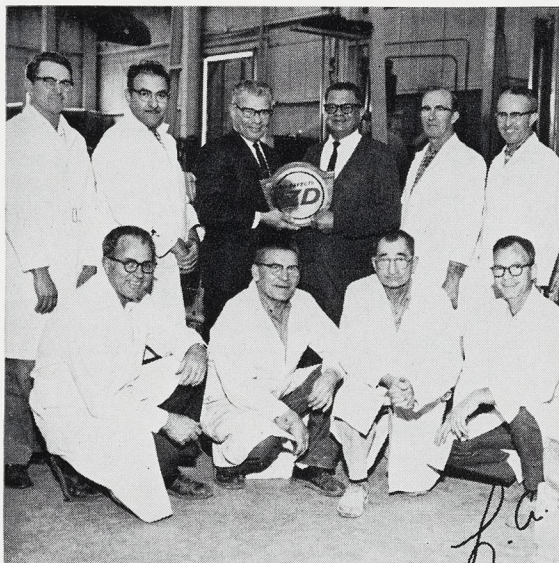
Located at the extreme northwest corner of the Hawthorne complex, the Foundry shop is a different world from the streamlined assembly route of the F-5 and T-38 or the air conditioned offices of the Engineering and Science Center.

Huge cauldrons of molten metal, bubbling at temperatures of 1000 degrees Fahrenheit or more, belch a shot of steam as ladles hanging from an overhead crane dip into them.

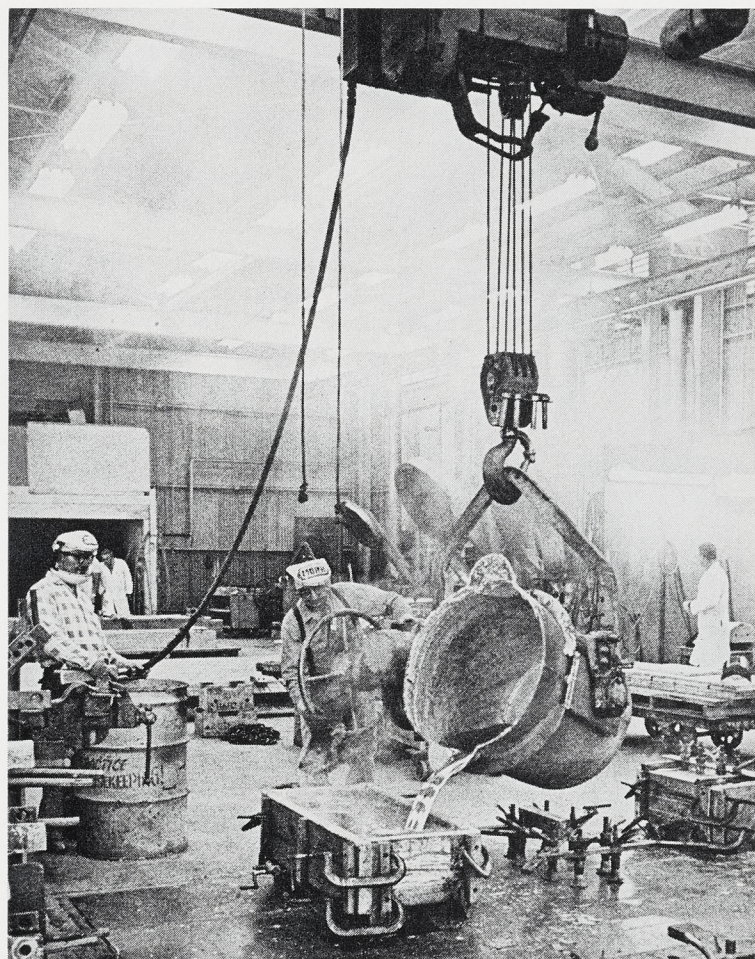
Guiding the ladles by chains and pulleys, the men pour the liquid metal into forms, where the metal hardens into tools which eventually find their way to all corners of the plant.

Foundry products range from lead hammers to a 10-ton slab of kirkite recently formed for a research effort. Most frequently called for are drop hammer and stretch press dies used in forming contoured aircraft parts. These may weigh more than 30,000 pounds.

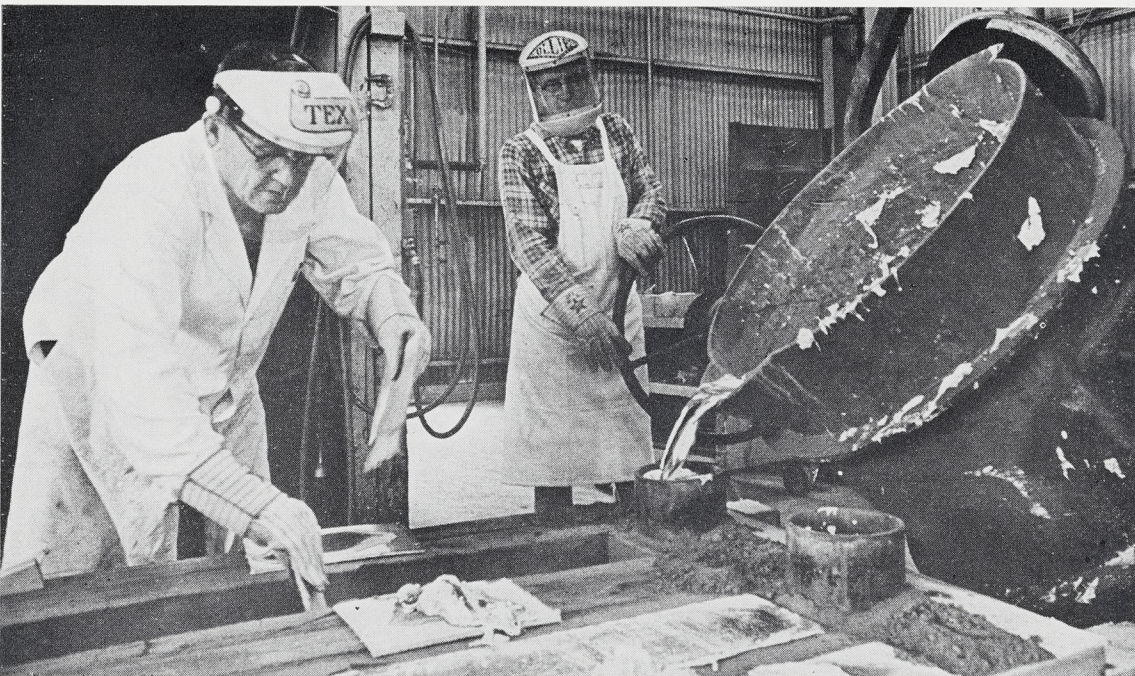
The Foundry pours more than 12,000 pounds of lead and 10,000 pounds of kirkite in an average day. Today's total weight of lead (See FOUNDRY, page 5)



Getting together for presentation of Tool Engineering's monthly Zero Defects award are Russ Smith, superintendent of Tool Design and Fabrication branch and members of the Foundry shop.

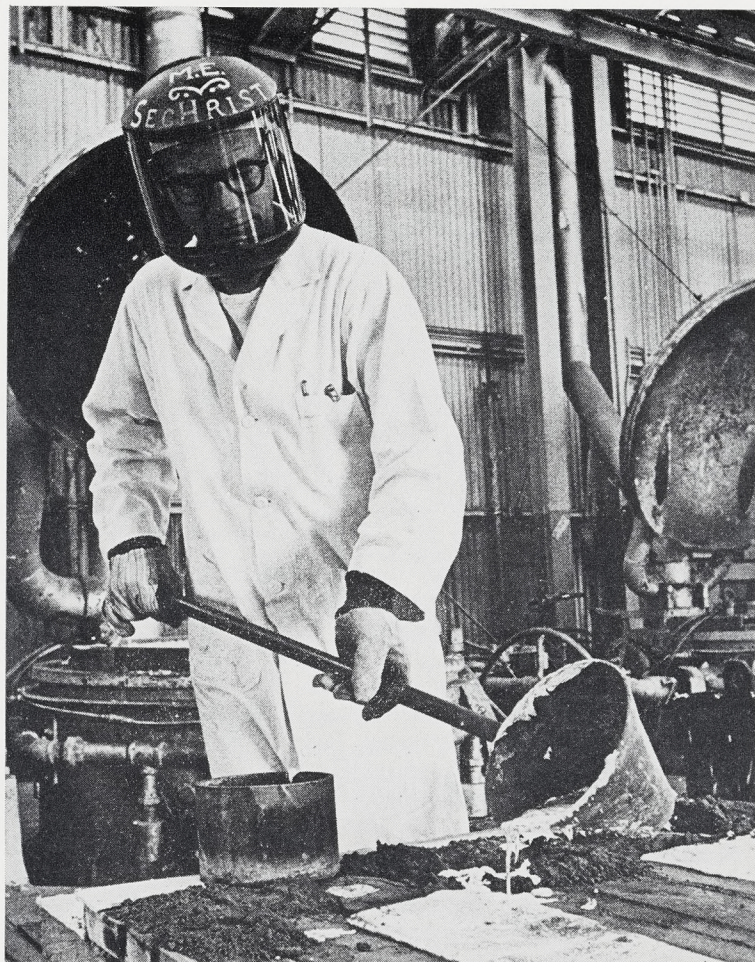


To make drop hammer die (above), Hubert Hoppen and Les Morr pour layer of lead which later will be mated with layer of kirkite. Mel Sechrist (below) performs one of final chores before leaving metal to harden, that of "topping off." One of unique aspects of Foundry shop is that, with one exception, every job can be performed by any man in the shop.



With Ercel Oliver at the wheel and Tex Robinson scraping off slag metal, aluminum billets for advanced aircraft program are poured. Although metal may register up to

1400 degrees (for aluminum), there has never been an injury from hot metal in Foundry shop history.



EAST AND WEST

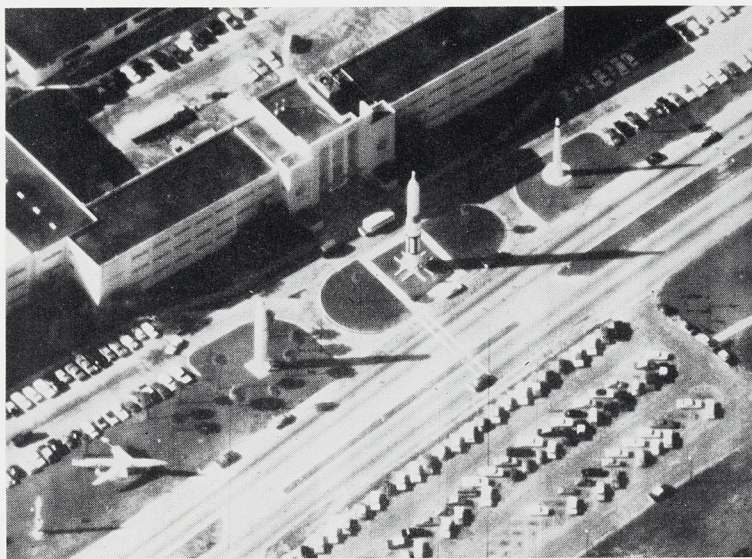
ALOTS Performance Tops Specs

Flying actual missions intermixed with Air Force flights, Nortronics' Airborne Lightweight Optical Tracking System has proved it can do the job it was designed for: high-resolution long-range tracking and photography of missiles as they accelerate into space.

From about 40,000 feet altitude ALOTS tracked and photographed the recent Gemini 8 launch at the Air Force Eastern Test Range (AFETR) that led to the first space rendezvous and docking.

Without landing again at Patrick Air Force Base, Florida, AFETR headquarters, the Boeing NKC-135 modified by Lockheed bearing the optical portions of ALOTS in its external pod, turned westward across the continent to monitor an Air Force launch at Vandenberg Air Force Base, California.

Operating the ALOTS equipment during these and other successful missions were Don Eakin and Jaime Oaxaca, both on the



NOT FROM A TALL BUILDING—ALOTS photographed Technical Laboratory at Patrick Air Force Base from between 11 and 14 miles away at 41,000 feet altitude. Slant-range photo shows array of missiles before building (from left) Pershing, Snark, Thor, Titan and Minuteman. Black lines are scratches on negative.

development team for the optical tracking system.

The acceptance test procedure included seven flights. Six photographed a target plane bearing Air Force standards resolution charts.

At five-mile range clear photographs were obtained of black bars 1.8 inches wide on a white background painted on the target plane's tail surface.

Jack Gantz, ALOTS project engineer, couldn't be happier with the way the optical tracking system is operating.

"Performance has been excellent," he said. "Better than specifications."

"We've caused considerable interest on the part of people involved in intelligence and reconnaissance, and others who need the capability of seeing from the air with high resolution."

ALOTS acceptance by the Air Force came in the form of a teletype message from Chester W. Smith, contracting officer at Patrick Air Force Base.

"Resolution tests," the message said, "have been successfully completed and the results indicate the resolution capability of ALOTS exceeds the minimum technical requirements of contract specifications."

"Based on successful com-

pletion of tests the ALOTS system has been accepted . . ."

Designed to fly at about seven miles altitude, ALOTS operates above 75 percent of the earth's atmosphere, eliminating much of the atmospheric distortion observed in missile surveillance photography from the ground.

The optical system permits high-resolution photography of targets measuring 12 feet from a distance of 200 miles.

Flying at 42,000 feet near Patrick Air Force Base, ALOTS was able to take pictures of the ground that clearly showed a man leaving home for work, complete with well-defined early morning shadow. It took pictures of children playing ball, and in several frames the ball itself is clearly visible in its flight from one youngster to another.

All this was accomplished through the higher density atmosphere below the NKC-135, through which such fine performance is not normally expected.

For missile surveillance, taking pictures through the rarefied higher atmosphere, ALOTS will provide information on conditions during launch that have never before been clearly photographed.

Events during missile launch would be observable during important phases despite dense cloud cover at ground level.

gence, and Command and Control needs of aerospace and defense programs.

"The systems approach so long recognized in the aerospace industry," Mr. Turney pointed out, "is becoming more encompassing of any company's efforts."

"The five individually oriented groups," he said, "will have decided advantages in coordinating the hardware needs of a total system now that they are together in the Space and Information Systems section."

Mr. Turney spoke of the phases of a military or space mission with which the groups in his section align themselves:

Data Acquisition, or obtaining information from various sensors as a prerequisite to a mission;

Intelligence, or the processing and interpretation of the information gathered;

Command and Control, the presentation of the information to decision making authorities.

"Working together," he said, "we can better define and produce the systems

AIR UNIVERSITY NAMES HORNER TO VISITORS BOARD

Richard E. Horner, Northrop senior vice president and Norair general manager, was one of 13 nationally prominent men selected by the U. S. Air Force Air University to evaluate its educational program.

The educators, business executives and professional men form the Air University's Board of Visitors. This is Mr. Horner's second year on the board.

During a four-day meeting, board members conducted an intensive examination of the Air University at Maxwell Air Force Base, Montgomery, Alabama, its mission, organization, management and policies. The command's curriculum, methods of instruction, facilities and other aspects of operation were also studied.

The board's recommendations were submitted to Lt. General John W. Carpenter III, Air University commander, to assist him in carrying out the mission of the Air Force's professional educational center.

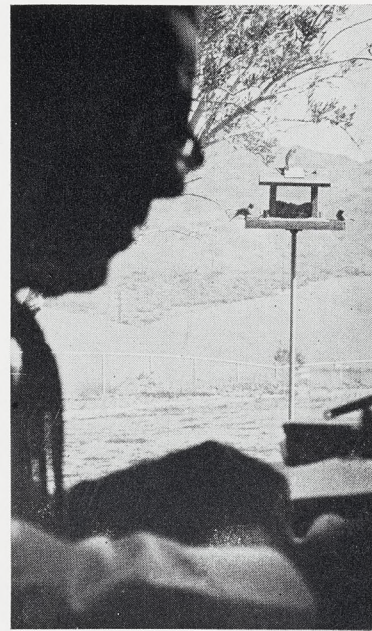
The meeting was the board's 22nd since it was established in 1946 by General Muir S. Fairchild, first commander of the Air University. The command celebrated its 20th anniversary earlier this month.

Managers in Action Theme of New Series

Present and potential managers have been invited to see "Managers in Action," a series of 13 down-to-earth talks by Lawrence A. Appley, president of the American Management Association, at 10 p.m. each Monday on KCET-TV, Channel 28.

The presentation by Los Angeles educational television began this week and will continue through July 18.

The series is also recommended for "every man's wife who ever wondered 'what is management anyway' and for every man's son or daughter who expects to take a place in the world of business."



Adding a personal touch to the wondrous surroundings of Northrop Ventura's Newbury Park facility, Paradyamicist Theo Knacke installed this bird feeder outside his office window just in time for spring.

Knacke Selected For AIAA Group On Deceleration

Paradyamicist Theo Knacke of Northrop Ventura will join 21 other experts on NASA and Air Force recovery systems on an American Institute of Aeronautics and Astronautics Aerodynamic Deceleration Systems committee.

The AIAA committee includes internationally known pioneers in the fields of parachutes, balloons, Ballutes (parachutes which fill with air as they descend) and paragliders.

Heading the group is Earl C. Myers, technical director of the Air Force 6511th Parachute Test Group at El Centro, California.

One of the committee's tasks will be presentation of a national symposium on aerodynamic deceleration on September 7 to 9 in Houston, Texas. The meeting will cover advanced thinking in the fields of space recovery, cargo delivery and allied technical subjects.

Mr. Knacke was responsible for some of the original research on supersonic parachutes as well as being co-inventor of ribbon parachutes,

WITH A BUSINESS ORIENTATION

Five Groups Reorganize At P.V. For Systems Approach

Planning techniques usually reserved for scientific research and development programs are currently being assessed as tools for use in business areas at Nortronics' Space and Information Systems section.

Mike Turney, director of the recently expanded section, reports that statistical analysis is being applied as a part of the section's planning efforts. Objectives are to scientifically assess program opportunities to assure selection of those which have high investment return probability.

The Space and Information Systems section was expanded late in 1965 to consolidate the efforts of hardware and systems oriented groups into an integrated effort towards specific business objectives. It includes the Systems Engineering, Command and Control, Information Systems, Weapons Status Reporting, and Tracking and Display Systems groups.

The consolidation of these groups permits the alignment and continuity of capabilities that are best concentrated towards the Data Acquisition, Intelli-

hardware to meet the needs of these mission phases."

The use of statistical techniques as an aid in determining the section's goals begins with advanced analysis of customers' and potential customers' needs.

As early as three years in advance of the stage when proposals may be appropriate, Applications Engineers and Market Research personnel are contacting representatives of government agencies or firms that Nortronics does, or plans to do, business with. These contacts are maintained to keep abreast of customer requirements. They continually submit information rating competitors' capabilities and customers' funded positions for each potential program.

This marketing information is collected, statistically analyzed and inserted into a projected business plan where the probability of award, expectation dollars, and investment necessary to properly pursue these programs are derived.

"Through these data," Mr. Turney said, "we can determine our best bet acquisitions and concentrate our re-

sources in their pursuit. We align our R&D projects and technologies in support of markets we seek in order to enhance our capabilities of obtaining new business."

Chiefs of the five groups in the section are A. R. Vogel, Weapons Status Reporting; S. V. Edens, Information Systems; G. J. Friedman, Systems Engineering; Ross Chiles, Command and Control; and D. E. Conklin, Tracking and Display Systems.

Assigned by the Marketing department to this area of activity as Applications Engineers are Bob Miller, Gene Courtier, Bob Morgan, Bob Rodgers, Tim McCarty, Chuck Blaney and Gordon Wedell, with Vic Bray, and Homer Starnes as chiefs of Applications Engineering.

Roy Graboff, Hirsch Evans, Norm Bolduc, Bill Miller, and John Roehrig of the Technical and Operations Project Analysis and Reports groups represent the Finance and Administration and Control sections in establishing and maintaining the business systems in this section.

Classified

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private business are not accepted. The Northrop News reserves the right to edit or omit ads. Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

For Sale

VW Conv., 1961, new paint, tires, excel. mechanical condition, \$950. Studio City. PO 3-1024. A

Panel Truck, 1955 Chevrolet, \$200. Lawndale, 370-3365. A

Camera, Polaroid, model 95B w/flash attachment, take color or black & white, \$35. Torrance, 835-2367. A

Pups, poodles, AKC reg., silver, small min., 1 male, 1 female, born Feb. 8, \$100 ea. Fullerton, 871-4592. A

MGB, 1965, removable h/top, r/h, \$2550. La Habra, 691-9534. A

Apt. Bldg., 9 deluxe units, 3-bdrm. owner's unit with f/p, \$12,500 yearly gross, No. Inglewood area, \$105,000. Torrance, 325-9832. A

Dog, boxer, fawn, female; white chest, blaze, & socks; cropped, docked & perm. shots; AKC reg., consider lease arrangement, \$150. Redondo Bch., 378-4676. A

Pickup, 1955, 1/2 ton Chevrolet, GMC Hydro, completely restored, new 6-ply tires, \$650. Compton, 823-1945. A

House, 3-bdrm., den, fireplace, lge. patio, complete landscape, block wall, on corner, near all schools & fwys., \$25,000. Garden Grove, 534-1748. A

Volkswagen panel, 1958, \$300. Inglewood, 329-0764. A

T-Bird, 1956, h/top, fresh o/haul, paint & tires, auto. trans., orig. owner, \$1275. Pac. Palisades, 454-2057. A

Chalet, new, completely furn., sleeps 10, Lake Gregory area, San Bernardino Mtns., will take second, \$32,500. P.V., 377-2058. A

Gas Heater, vented, panel ray, 5 1/2 ft. tall, \$25. Inglewood, 677-4292. A

Slide Projector, 35mm Tower, remote control, \$40. Inglewood, 674-0755. A

Bicycle, 10-spd. Derailleur, \$30. Long Ech., 422-8835. A

Willys, 1953, Mercury rear end, early Ford front end, \$25. Long Bch., 434-7155. A

Dishwasher, portable, GE deluxe, w/cherrywood top, \$195. Manhattan Bch., 374-0940. A

House, 3-bdrm., family rm., 1 1/4 baths, bltins, oble. gar., 3 1/2 yrs. old, \$22,950. Lom-inguez Hills, 632-7702. A

Military Jeep, 1942 Willys, \$455. Fullerton, LA 5-4839. A

Stereo Hi-Fi Components, AM/FM tuner, dual amplifiers, dual preamps, dual crossovers, 4 speakers, stereo turntable, \$70. Hawthorne, 676-0418. A

House, new, 3-bdrm. & den, 2 baths, bltin range, dishwasher, disp., thermo. heat control, \$2000 dn., Simi Valley, \$22,000. Redondo Bch., 378-3809. A

Sprite, 1958, new top, paint, windows, tonneau, custom int., \$850. L.A., EX 7-5514. A

Sailing Dinghy, 3/8" plywood w/cotton sail, \$85. San Peuro, TE 1-9545. A

Pickup, Ford Ranchero, 1963, air cond., new General Tires, tonneau cover, orig. owner, \$1150. Redondo Bch., FR 4-7139. A

Tape Recorder, voice & music, 2-track, 2-spd. stereo playback, \$40. Manhattan Bch., 379-6762. A

Baroell Set, \$10. L.A., 672-8972. A

Organ, Thomas electronic, single manual, bass pedals, tone controls, bench & music avail., \$125. Torrance, 323-4209. A

Tent, 9x12 umbrella w/side room, green, dry wall construction, \$30. Thousand Oaks, 679-5521. A

House, 4-bdrm., family rm., 2 1/2 baths, 1-acre, horses OK, near Northrop Ventura, \$35,000. Somis, 805-482-1186. A

Glass Sloop, 15', \$550. Torrance, DA 6-6497. A

Porsche conv. D, 1959, Michelin X tires, radio, new paint, \$1650. P.V. Pen., 377-4268. A

Organ, Conn Minuet, w/bltin Leslie speaker, fruitwood finish, lamp incl., 1964 model, \$1195. Manhattan Bch., FR 4-6215. A

Bicycles, boy's & girl's 26", \$5 ea. Lawndale, OS 9-0876. A

Trailer, 1961 Globe, sleeps 4, stove & refrg., 13 1/2', \$525. Hawthorne, 671-8413, OK 3-0995. A

Ford, 1956, 2-dr., p/s, r/h, good tires & eng., \$225. Hawthorne, OS 6-5219. A

Mercury, 1956, custom 2-dr. h/top, r/h, auto. trans., new Delco battery, o/load springs, 42,000 miles since eng. rebilt., 1-owner, \$150. Hawthorne, OS 9-6334. A

VW, 1966, Sunroof 1300, s/belts, low miles, \$1750. P.V. Pen., 326-4989. A

Chevrolet Bel Aire, 1955 2-dr. sedan, V-8, std. trans., \$375. Inglewood, 672-5834. A

Pontiac Catalina, 1960 convt., new top, p/s, r/h, w/s/w, \$895. Inglewood, 673-1589. A

Tape Player, cartridge-type, Bell model 404, w/14-watt stereo amplifier, incl. channel tone controls, \$65. Norwalk, 865-6736. A

Pups, min. schnauzer, AKC papers, \$100. San Pedro, 832-3755. A

For Sale

Organ, Conn electronic, blonde, \$500. Torrance, FR 8-1350. A

Ford station wagon, 1958, rebilt. eng., new paint, new tires, \$400. L.A., 775-7827. A

Camp Trailer, 14' Scotsman, sleeps 6, 3-burner butane stove, 3-way lights, ice box, \$750. Garden Grove, 714-539-0670. A

Trailer, 1957 Universal, 8'x40', 2-bdrm., completely furn., newly carpeted, bath, living rm., kitchen, dinette, small dn., bal. monthly, \$2500. Manhattan Bch., 676-7387. A

Chevrolet, 1957 2-dr., \$275. Long Bch., GA 2-5152. A

Plymouth Plaza, 1957 2-dr. sedan, 6-cyl., std. trans., 45,000 miles, good tires & uph., radio w/rear spkr., heater, s/belts, \$225. L.A., 752-7614. A

Corvair Monza, 1962, sport coupe, stick, 4-spd., \$935. L.A., 670-4342. A

Camper, 8' Alaskan, gas refrig., stove & extras, & 1959 Dodge truck, V-8, p/s, p/b, auto. trans., r/h, air, \$2100. Canoga Pk., DI 0-7752. A

Guitar, Fender Duosonic, w/case & cord., cost \$165, \$105. Wilmington, 834-4184. A

Washer, RCA Whirlpool 2-spd., 3 temp. settings, new pump, \$70. Compton, 635-9082. A

Opel station wagon, 1960, \$200. Huntington Bch., 847-0956. A

Impala Sport Coupe, 1963, air cond., p/s, auto., 29,500 miles, \$1600. Hawthorne, 894-2426. A

Tool Box & Tools, 24" Gerstner, \$160. Gardena, DA 4-8853. A

House, 3-bdrm., 1 1/2 bath, bltins, dble. gar., 1 mile from ocean, \$500 dn., \$20,000. Redondo Bch., 374-2433. A

Own-Your-Own Apt., 1-bdrm., 900 sq. ft., deluxe, bltins, pool, close to stores & transp., \$16,950. Inglewood, 674-7743. A

Metro, 1959 h/top, deck lid, new tires, \$350. Gardena, 327-3855. A

Chevrolet, 1959 Parkwood station wagon, r/h, Powerglide, V-8, \$450. P.V. Ests., FR 5-0867. A

Chevrolet, 1956, 4 new tires, needs ring & valve job, \$225. Hawthorne, 675-8367. A

Pontiac Bonneville, 1961, convt., p/s, p/b, p/windows, deluxe Wonder Bar radio, new top, 29,000 miles, \$1200. Hawthorne, 644-1785. A

Ski Boots, women's medium, \$10. Box 801. A

Home, 3-bdrm., fam. rm., 2 baths, all elec. kit., FA heating, flagstone covered patio, 2-car det. gar., lge. fenced yd., 7 mins. to Nortronics Anaheim, 4 1/2% GI loan or refinancing avail., \$22,650. Orange, 633-4378. A

Eico, model 221 VTVM less probes, \$15. Torrance, DA 6-8273. A

Range, Western Holly, 2 ovens, 4 top burners & top grill, \$80. Hermosa Bch., FR 9-7342. A

Falcon, 1963, deluxe wagon, under seal Fordomatic, 6-cyl. rack, \$1275. Redondo Bch., FR 8-2609. A

Renault Parts, miscellaneous, \$30. DA 6-5558. A

Stereo Hi-Fi, Packard Bell, auto. 4-spd. record player, AM-FM tuner, 2 ea. speakers, 15" Woofer, oval mid range & horn tweeter, 120 watts amp., maple cabinet & matching enc., cost \$625; \$195. Redondo Bch., FR 6-6415. A

Utility Trailer, 2-wheel, 5'x9' bed, spare wheel & tire, \$75. Canoga Pk., 346-5958. A

Vacation Trailer, 15', 1956, spare tire, bumper, sleeps 5, extras, \$640. Hawthorne, 679-7497. A

Refrigerator Frigidaire, small, freezer, \$25. Inglewood, OR 4-7301. A

Range, elec., Westinghouse, coppertone, auto. controls, 1 1/2 yrs. old, 4-burner, \$100. Gardena, 324-0274. A

Wedding & Engagement Ring, diamond, white gold, cost \$700, \$350. Hawthorne, 679-2456. A

Surfboard, 9' 1", 1 stringer, clear, no open dings, \$55. Redondo Bch., FR 5-0061. A

Pickup, 1959 Chevrolet, 1/2-ton, Hydro., r/h, low mileage, \$675. Hawthorne, 676-1018. A

Ford, 1901 1/2-scale model, holds 1 adult or 2 children, buggy top, wire wheels, \$45. Anaheim, 774-2779. A

Rambler, 1963, 4-dr. Classic, air cond., r/h, new tires, std. 6-cyl., \$1099. Buena Pk., 714-521-0416. A

Bar-B-Que, Big Boy, 21" dia. w/motor brazier, used twice, \$5. Hawthorne, 676-0758. A

Ford, 1940 deluxe, coupe, 1955 Buick eng., new black paint, \$350. Torrance, 371-8564. A

Motorcycle, 1954 Zundapp, new rings & valves, near new trans., \$100. Manhattan Bch., 374-7318. A

Motorcycle, 3-wheel, lightweight, 2-spd. trans., clutch & brakes, \$65. Redondo Bch., FR 5-0747. A

Corvair Monza, 1965, stick shift, r/h, w/w, s/belts, 13,000 miles, \$1700. Compton, 635-2648. A

Chevrolet, 1956 sedan, new tires & battery, \$140. Cypress, 673-1543. A

Television, 19" Muntz, new picture tube, 11 mos. guarantee, o/hauled, \$25. Inglewood, 678-1350. A

Tempest, 1963 station wagon, 4 cyl., 4-spd. manual trans., tachometer, b/seats, fact. air cond., Michelin tires, orig. owner, \$1400. Hollywood Riviera, FR 8-7577. A

Pups, 6 wks. old, wire haired & terrier mix, \$2.50. Lawndale, FR 0-9440. A

Table Saw, 10", tilting arbor, 1 hp motor, \$130. Redondo Bch., OS 6-2491. A

Bed, queen size, foam mattress, \$40. Eastview, TE 2-1684. A

For Sale

Poodle, black, 4 mos. old, std., female, AKC reg., \$70. Gardena, 324-3760. A

Divan & 2 color coord. easy chairs, used 9 mos., \$600 value, \$250. Torrance DA 7-2851. A

Organ, elec., walnut, 6 voices, vibrato, pedal bass, \$135. Culver City, VE 9-5438. A

Sheepdog, shetland, tri-color, female, AKC reg., 7 mos. old, \$45. Inglewood, OR 1-0046, OR 4-9481. A

House, 2-bdrm. & den, 50x150 lot, fenced, \$17,500. Redondo Bch., 376-1610. A

Chevrolet, 1958 Impala, p/b, p/s, Turbo-glide, r/h, 345 cu. in. V-8 eng., \$400. P.V. Pen., FR 7-4668. A

Stereo Console, Magnavox, 2-unit, ebony & gold finish, \$150. Garden Grove, 530-1734. A

Bed, twin, head & foot boards, Baumritter maple, \$25. Santa Ana, 714-839-1797. A

Crutches & metal walk aid, \$18. Canoga Pk., 348-8588. A

Ping Pong Table, plywood, 5' x 9' x 5/8 thickness, \$10. Lawndale, OS 9-0876. A

Corvair Monza, 1962, coupe, 4-spd., r/h, large eng., new brakes & shocks, 4 new Michelin X tires, many extras, \$1000. Huntington Bch., 714-847-2648. A

Plymouth, 1956, radio, auto. trans., stabilizers, w/w tires, \$195. Hawthorne, 644-1958. A

Bar, custom-made beer bar, 3' by 3' by 4'6", \$180. Hawthorne, 679-8009. A

Radial Saw, Delta Rockwell, hvy. duty, 10" model, 1 1/2 hp dual voltage motor, Incs. stand & extra blade, cost \$400, \$225. P.V. Pen., 377-6434. A

Impala, 1964, 4-dr. h/top, 327 eng., factory air, auto, p/s, new tires, \$2395. Gardena, 327-2279. A

Dodge, 1963, 330 2-dr. sedan, full fact. race equip., never raced, \$1400. Box 802. A

Chevrolet, 1957, 2-dr., auto. trans., r/h, recently painted, \$225. Torrance, 835-5708. A

Studio Couch, Simmons, brown & white striped, new, \$40. Hawthorne, OS 9-6449. A

Vacuum Cleaner, Hoover upright deluxe model w/attachs., \$55. Fullerton, 714-529-4788. A

T-Bird, 1962, r/h, all power, good tires, \$1200. Inglewood, 677-0743. A

Surfboard, foam, 7' 6", blue, \$25. Manhattan Bch., FR 9-7490. A

Impala sport coupe, 1958, 348 cu. in. w/ Turbo-glide, chrome wheels & many extras, \$975. Lynwood, 632-2642. A

Alfa Romeo Spider, 1964, Perelli's in good cond., disc brakes & 5 forward, \$2895. Lynwood, 635-3784. A

Wanted to Buy

Battery Chargers, 24 volt, 3 to 5 amp. & 12 volt, 10 to 20 amp. Whittier, OX 3-4117. A

Coffee Table, walnut, & vacuum cleaner, Kirby, Wilmington, 835-9070. B

Pool Table, 8', slate top, any condition. Redondo Bch., FR 2-8254. B

Dishwasher, portable. Inglewood, OR 1-8106. A

Set of children's right-hand golf clubs, & bag. Pico Rivera, OX 5-1445. B

FRINGE BENEFITS
(Continued from page 2)

know, there used to be a standard deduction of 14 percent, but beginning May 1 there will be six different withholding rates scaled upward from 14 to 30 percent. Unless the Government changes its mind, we won't be paying any more income taxes for the year but we will be paying them faster. This may not be a bad idea since we shouldn't have to dig down in our pockets so much next April, but we will have less money as we go along.

Then we have our fine Salaried and Hourly Savings Plans under which the company puts up 50 cents for each dollar we deposit. It is almost impossible not to take advantage of this kind of investment and most of us are in one plan or the other. All of this doesn't seem to leave much room for buying savings bonds. The fact remains, however, that 78 percent of our people are putting by something, perhaps as little as 50 cents a week, to buy a United States bond. The interest rate gets better each year.

One of the most gratifying things about the whole plan is that we do not have to pay income tax on any of the interest which is accumulating on Series E Bonds until we turn them in. All in all, these bonds look pretty good after a few years if we buy by paying a little at a time. We are now being requested by our Government to step up our participation. I hope that most of us can spare that extra little bit for a bond deduction.

I don't want to get away without thanking the many nice people who have written me about these articles and about the things which our benefits have done for them. One letter came to me this morning from one of our people who had had an extended illness. She said, in part:

"Your articles in the Northrop News have been very helpful in understanding the various fringe benefits offered by your plan. As one

FREE (To Be Given Away)

Pups, 6, Collie & Weimaraner, assorted colors. Hawthorne, 675-8262. D

Kittens, half manx, red or red & white, 1 female, 3 males, 4 wks. old. Box 803. D

Rentals Offered

Apt, deluxe, 1-bdrm., bltins, pool, \$95 mo. Redondo Bch., 376-2117. E

Apt, 3-bdrm., unfurn., deluxe, bltins, 1 1/2 bath, pvt. patio & gar., children OK, near Northrop, \$140. Hawthorne, OS 5-7938. E

Housekeeping Cabins, stream, patios, \$20 to \$30 weekend, \$50 to \$70 wk. L.A., PL 4-5288. E

Vacation Cabins, Lake Gregory & Crestline, make reservations early for May thru Sept., \$25 weekends, \$60 wk. Venice, EX 1-2040. E

Apt, deluxe 2-bdrm., furn., lge. pool & patio, bltins, closed gar., near El Camino, \$135. Torrance, DA 9-5986. E

House, 2-bdrm, stucco, h/wood floors, tile kitchen & bath, near Northrop Hawthorne, \$105 mo. Lawndale, 644-2002. E

Apt., 1-bdrm., furn., bltins, pvt. deck, lge. pool, sub. parking, near Northrop, \$137.50 mo. Lawndale, 670-6084, 679-2117. E

Apt., 1-bdrm., unfurn., bltins, disp., water & trash pd., laundry facilities, children OK, \$89.50. Hawthorne, 675-8388. E

Apt, 2-bdrm, bltins, 15 mins. from Northrop, \$125 mo. Torrance, 325-9832. E

Apt., lge. 1-bdrm., natural wood cabinets, carport, laundry rm., walk to Norair, \$95. Hawthorne, 675-2075. E

Bachelor Apt., furn., utilities, 2 blocks so. of Northrop, \$85 mo. w/lease. Hawthorne, 676-1287. E

Apt., 1-bdrm., downstairs, partly furn., stove & refrig., near Northrop, adults only, washer & dryer facilities, carport, \$90 mo. Hawthorne, OS 6-8283. E

Apt., 1-bdrm., lge., 35' living rm. w/fireplace, open beam ceiling, furn. in maple, washer, utilities incld., 1 or 2 adults, close to Northrop, \$130 mo. Lawndale, OS 6-5425. E

Cabin, Green Valley Lake, \$35 weekend, \$60 wk. Torrance, 320-2002. E

Bachelor Apt, furn., near beach, \$65 mo. Torrance, 376-4496. E

Apt, 1-bdrm., ext. lge., bltins, gar., close to Northrop, \$90. Harbor City, 325-5705. E

Apt, 3-bdrm., furn., lge. rooms & closets, picture window, patio, 4 short blocks to Northrop Hawthorne, \$155 mo., inclds. utilities. San Pedro, TE 3-2512. E

Apt, 1-bdrm., furn. & unfurn. fireplace, 1/2 block to ocean, closed gar., adults, from \$115. Redondo Bch., FR 8-7905. E

Personals

Sewing Instructions needed to assist in completion of dress & jacket, approx. 3 hrs. work, will pay. Inglewood, 674-1730. L

Alterations of all kinds especially men's clothes. L.A., PL 4-9866. L

Will pick up new car in Europe this summer for anyone who wants one. Hawthorne, 679-5530. L

Personals

A heartfelt thank you to all Norair & Nortronics personnel for their generosity & sympathy during our recent time of sorrow. WAYNE & SHERI QUELLETTE. L

I wish to express my deep appreciation to our many friends at Norair & Nortronics for their many kindnesses during Roland's recent illness & passing. KATHRYN GLINES L

For Sale or Trade

Buick, 1953, 2-dr. Super w/radio, good tires, runs good, \$150 or trade for electronic test equip't or photographic equip't. Hawthorne, OS 5-3866. M

Lincoln Zephyr, 1937, classic, 4-dr., runs good, \$350, or trade for motorcycle. Lawndale, DA 9-6235. M

Going my way?

Rides Wanted

7 a.m. — 3:45 p.m.

Oak & Manchester, Inglewood. Raphael Mederos, Norair, ext. 1714. 2

Yukon & 170th St., Torance. Louie Quijano, Norair, ext. 2550, 2622, 329-8621. 2

8 a.m. — 4:45 p.m.

Figueroa & Anaheim, Wilmington. Tom Henrich, Norair, ext. 2425, 835-9070. 5

South St. & State College Blvd., Anaheim. Robert A. Buhbe, Norair, ext. 1465; 1466, 714 - 776-3939. 5

Rides Offered

8 a.m. — 4:45 p.m.

South St. & State College Blvd., Anaheim. Robert A. Buhbe, Norair, ext. 1465; 1466, 714 - 776-3939. 15

Motorcycle, 1963, Honda 305cc, \$375, or trade for pickup. Torrance, 320-3074. M

MGA Roadster, 1962, 1600 Mark II, r/h, \$1200, or consider sports car in trade. Port Eend, 377-8444. M

Northrop Retirees
Being Contacted

An important letter to all Northrop Corporation retirees was placed in the United States mail last week.

It contains an invitation to retirees and their spouses to take part in a potential organization to be made up exclusively of retired employees and guided by them.

Because of recent address changes and other factors, some retirees may not receive this letter. Those who do not, are invited to contact Personnel Activities at Northrop Norair for further information.

FOUNDRY

(Continued from page 3)

and kirksite tools and raw metals in the plant is in excess of 4.8 million pounds.

For one advanced aircraft program, the Foundry is pouring aluminum billets weighing 1160 pounds each for making mill fixtures.

According to Frank Rosenstiel, general foreman of Templates and Form Tools shop, the Foundry is saving the company \$500 each on the 40 or so billets which will be required. (The Foundry is part of Mr. Rosenstiel's organization, which in turn is part of Tool Design and Fabrication branch, one of five branches in the Tool Engineering group).

"This is another feather in Duke's cap," Mr. Rosenstiel said. "Somehow he has rounded up 34,000 pounds of aluminum from around the plant for re-use. The billets would cost us at least \$600 each if we had to buy them from an outside source."

The Foundry has been saving money like this for Northrop since it was installed in 1940. The metal in the tools which were used to build one of Northrop's first planes, the P-61, is still flowing for the F-5/T-38 programs. It will probably still be in use when the supersonic transport is old history.

"Periodically," Mr. Ozenne says, "we send the metal out for rejuvenating. But it's still the same that was cast in 1941."

There has been little capital expenditure for Foundry equipment either. The same cauldrons have been boiling 24 hours a day since 1941.

insurance agent said to me, 'The fringe benefits are the best and most extensive I have seen in my many years of insurance work. Northrop is a good Company.' I agree wholeheartedly . . . Again many thanks, and I wish Northrop Corporation continued success."

To all of you people who have been kind enough to write me, thank you again.

Club to Hear Lecturer on Management

Management training specialist Max B. Skousen will address the Northrop Ventura Management Club next Wednesday evening on "The Care and Feeding of the Grapevine."

This is the third of the Club's 1966 series of programs on communications in management. The dinner meeting will open at 5:30 p.m. at American Legion Hall, Woodland Hills.

Mr. Skousen has lectured nationally on business management subjects. He is president of the largest tax service company on the Pacific Coast, serving more than 25,000 clients annually.

Author of successful books and pamphlets, he was recently awarded the George Washington Gold Medal and the Alexander Hamilton Award by the Freedoms Foundation of Valley Forge for his work in free enterprise economic education.

TURKEY

(Continued from page 1)

Military Mission Aid to Turkey (JUSMMAT); Brigadier General Andrew S. Low, chief of the Air Section, JUSMMAT; and Brigadier General Sam Byerley, commander of Turkish-U.S. Logistics (TUSLOG).

Representing Northrop were Patrick W. Timberlake, Corporate vice president and special assistant—International, and C. R. Gates, vice president—International.



Junior Achiever Cheryl Polen tries seat of Suzuki motorcycle she won during sales convention for school-age entrepreneurs (businessmen). Cheryl's string of successes included being finalist in Greater Los Angeles Miss Junior Achievement of 1966 competition and being named a junior executive by advisors of the Northrop Ventura-sponsored J-A company, CONACO, Inc.

Chapter Observes Secretaries Week

Members of Los Robles Chapter, National Secretaries Association (International) breakfasted Tuesday with members of management in honor of National Secretaries Week, April 24-30.

The breakfast took place at DuPar's in Thousand Oaks, including Chapter members from Northrop Ventura.

Billie Linebarier of Northrop Ventura is first vice president of the Conejo area chapter and Marjie Shaw, a Division employee, is chairman of the Chapter's Secretaries Week activities.

NVRC ROUNDUP

Talent Show Set for June

Northrop Ventura employees and their families will get out their musical instruments, vocal arrangements, comedy and dance routines soon for a Division-wide talent show.

Scheduled for June with a May 5 deadline, the talent event will include any type of amateur or semi-professional performer who wants to entertain his co-workers.

Program Chairman Dan Cashier said those who plan to participate may contact him at extension 373; Dorothy Prychoda, extension 264; or Peggy Walthius, extension 341.

"We're planning prizes for the three most talented entertainers or groups," Mr. Cashier said, "including a first prize of a trip for two to Las Vegas, or its equivalent."

Audition dates will be announced shortly after the May 5 entry deadline, the chairman reported.

* * *

Bridge Points Won By Peterson, DePue

Winners of the Bridge Club April master point tournament were Gene DePue and Cal Peterson, first place; Jo Ninninger and John Swanson, second; Margot Ellenburg and Tony Piscuskas, third; and Betty Reinisch and Colleen Peterson, fourth, Commissioner Swanson reported.

Fifth place was a tie between partners Ed Frangos and Forrest

Godfrey, and the team of Bill Coonfield and Dick Sassman.

A new tournament starts each Monday during the noon hour in the Northrop Ventura cafeteria, although the master point events are monthly only. Additional information may be obtained from Mr. Swanson at extension 619.

* * *

Rod & Gun Club Aims At Meatball Barrage

Rod and Gun Club "ammunition" will be meatballs instead of birdshot May 7 when members and guests sit down to an old fashioned family style Italian feast, courtesy of fellow member Joe Ferro.

Long noted in the Club for his culinary capability with Italian pastas, Mr. Ferro will provide antipasto, spaghetti, polpetta, insalata, and pane Italiano, accompanied by vino rosso and topped off with coffee.

What this menu will mean to the diners that Saturday night at 8 p.m., according to Chef Ferro's translation, is Italian appetizers, spaghetti and meatballs, salad with Italian dressing, and rich white Italian bread.

The wine, of course, will be a dry red one appropriate for the meal.

The dinner at Chatsworth Center, 10332 Santa Susana, Chatsworth, is open to Northrop Ven-

tura Recreation Club members, families, and friends. Cost per person is \$2.50.

FIBERGLASS

(Continued from page 1)

Norair and several experienced Norair plastics workers are expected to transfer to Ventura.

Five basic categories of plastic production processes will be handled within Plastic Products. These are vacuum forming, hand laminating, compression molding, bench work and assembly, and foaming operations.

Most of the jet trainer and fighter work falls into the area of hand laminating.

Providing a new area of capability, a Northrop-developed vacuum forming machine will become part of the shop's equipment.

Mr. McLaughlin reported that the unique machine is entirely automated and far ahead of the remainder of the plastics industry. The vacuum former, not to be confused with the equipment utilized in vacuum bagging of fiberglass parts, will be used with three plastics already familiar to the branch, Royalite, linear polyethylene, and polycarbonate compounds.

"This should put us in a very competitive position," he said, "to acquire new business in the vacuum forming field."

CAROLINA: Asheville Subsidiary On Frontiers of Rocket Development

(Continued from page 1)

all-solid-propellant rocket system," A. Terrel Jones, jr., manager of Ordnance Development and Test Operations, said.

"This is probably the first and only truly working solid-propellant motor that can be throttled or stopped and restarted on command. You don't have to pre-program anything."

The CSR was first fired—and successfully controlled—in the fall of 1963. Subsequent tests, conducted under contract to the Air Force Rocket Propulsion Laboratory at Edwards AFB, have brought significant refinements to the technique of solid propellant control.

The CSR has only one moving

part—a valve that functions as a throttle. It can be stored for long periods before firing, more than five years, according to Mr. Jones. Its unit cost is low and its field-maintenance needs are minimal.

Northrop Carolina also developed the CSR's unique fuel and oxidizer propellents.

The Asheville firm, which was acquired by Northrop last October, also is the developer of the first combustible rocket motor. This motor consumes itself after shutdown, thereby eliminating any danger from launchings over populated areas.

Most rockets today are launched away from populated areas because of the potential hazards to persons and property.

LIFTY LOUIE'S DEBUT

One-Robot Battle Against Injuries

"Lifty Louie" has launched a one-robot battle against injuries caused by improper manual lifting methods—a problem which has cost Northrop more than a quarter million dollars in the past four years.

Louie, a mechanical man designed and built by Harry Barnett of Advanced Production, made his debut recently at the 13th Annual Western Safety Congress and Exhibits at the Ambassador Hotel in Los Angeles.

He demonstrates both the wrong and right ways to lift a load and, through a synchronized tape recorded message, describes what he's doing.

He has created a sensation, to say the least, and according to Chief Safety Engineer Lee Johnson, requests for Louie's personal appearance have been pouring in from all over the country.

However, Mr. Johnson indicated, Louie has a long-run exclusive engagement touring work areas at Northrop.

Mr. Barnett, meanwhile, has applied for a patent on the device through the Northrop Patent Award program. A retired engineer, he is working as a factory specialist in Rex Thornhill's Advanced Production group.

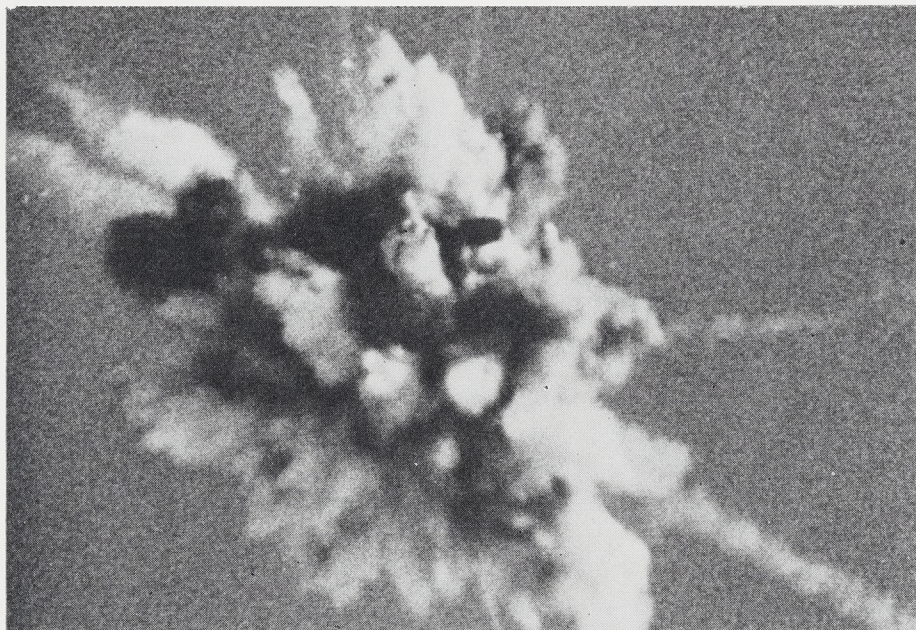
Most all of the design and

fabrication work was done in his spare time at home. Salvage materials were used and, to quote Mr. Johnson, "the cost was so low we don't even want to mention it."

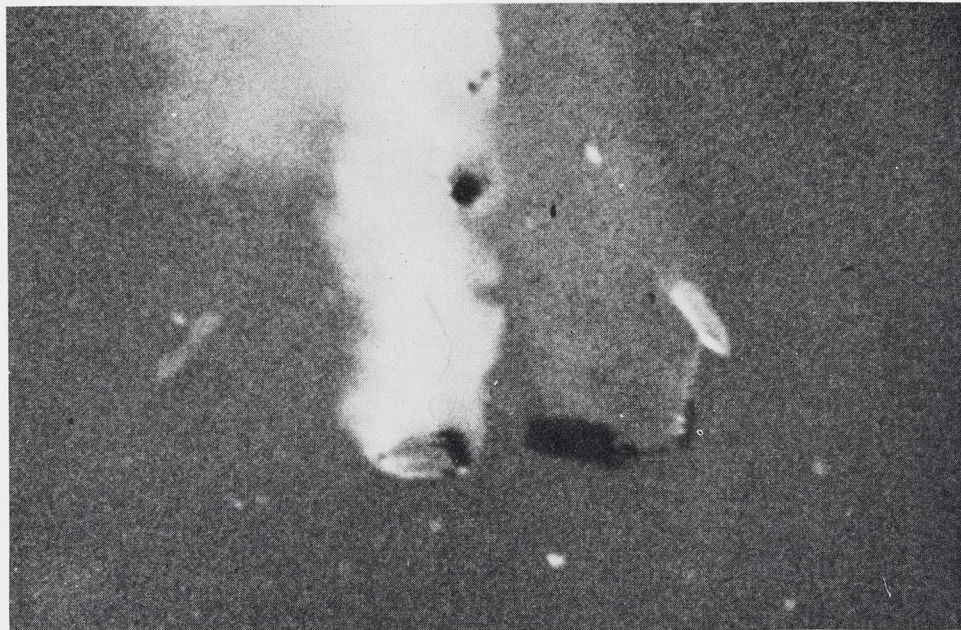
The anatomical preciseness of the robot is credited by Mr. Barnett to his early days as an art student during which he studied human anatomy. At one time, he also worked as a specialist in animation for Hollywood studios.

The voice of Louie is that of George Putnam of the Safety group at Norair. Mr. Putnam wrote the script and synchronized it with the robot's movements as well.

KD2R-5 ENDS FLIGHT AS DEBRIS



Explosion of missile warhead (left photo) leaves only pieces of 240-knot drone (right photo) to



settle to desert floor at China Lake Naval Ordnance Test Station, California. Some 20 six-

cylinder KD2R-5's have been built. Only changes were those required by more powerful engine

and improvement in speed over original 180-knot capacity. Photos courtesy of General Dynamics.

NORTHROP NEWS

NORTHROP VENTURA

Published biweekly by Northrop Corporation, Beverly Hills, California

Vol. 24, No. 9

May 11, 1966

Many Factors Counted in 747 Awards

Previous performance and a strong technical support capability were important factors involved in the selection of Northrop Corporation as an associate in the design, development and production of Boeing Company's new 747 jetliner.

R. W. Tilson, Boeing Commercial Airplane Division director of Materiel, indicated contracts were awarded on a competitive basis after intensive evaluation of previous performance, technical support capability and the ability to assume programs of a magnitude requiring substantial production investments. Also considered were geographic locations, labor markets and the performance of the subcontractor's respective suppliers.

"The scope of this manufacturing effort calls for a greater degree of involvement by our subcontractors than ever before required," Mr. Tilson said. "By the same token their opportunities to share in the rewards which this program holds are greater. We feel we have selected the best and are counting on their performance to insure the program's success."

As an associate of the Boeing Company in one of the largest programs of its type in commercial aviation history, Northrop will design, develop and produce virtually the entire 150-foot-long passenger compartment for the 747, largest aircraft ever designed for commercial use. It will carry up to 490 passengers.

Northrop's role in this program, based on a 400-aircraft production schedule, has a potential volume in excess of \$500 million. T. V. Jones, Northrop president and chairman, has estimated.

Northrop is currently moving ahead in three major areas to carry out early commitments involved in the program—by intensifying a manpower recruiting

(See BOEING, page 6)

LOFTY OCCUPATION



In the carefully controlled environment of Northrop Ventura's parachute materials stock room, Burnie Sklar takes inventory of various fabrics, including nylon, cotton and dacron. Nylon stocks, which have been

in Mercury, Gemini and Apollo recovery systems, may soon be supplemented with advanced fabrics which can withstand high sterilization temperatures required for planetary landing systems.

SALES, EARNINGS BOTH INCREASE FOR NINE MONTHS

Northrop earned \$6,904,000 on sales of \$244,000,000 in the first nine months of its fiscal year, Thomas V. Jones, Northrop president, reported Monday.

The nine-month earnings were equivalent to \$1.65 per share on the 4,179,343 shares outstanding.

In the first nine months of the previous year, Northrop earned \$6,136,000 on \$255,894,000 in sales, equivalent to \$1.50 per share on 4,097,939 shares then outstanding.

Third quarter earnings amounted to \$2,440,000, equivalent to 58 cents per share, with third quarter sales of \$88,845,000. This compares with third quarter earnings a year ago of \$2,116,000, equivalent to 52 cents per share with \$96,097,000 in sales.

(See EARNINGS, page 6)

007 Relegated to Tank Duty, While 011 to Soar in Space

In a complete reversal of recent trends, 007 has been assigned a secondary role.

NASA apparently has little regard for the magic number which, thanks to the late Ian Fleming's James Bond thrillers, now adorns everything from coed sweatshirts to men's toiletries.

The agency has assigned Apollo Spacecraft 007 to water impact and flotation tests in the Gulf of Mexico and in an environmental tank at the Manned Spacecraft Center, Houston.

Meanwhile Spacecraft 011 which contains a command module similar to those in which astronauts will ride in later Apollo flights, is being prepared for launch during the third quarter

of this year aboard a two-stage Saturn 1B vehicle.

Both vehicles were delivered recently to NASA by North American Aviation's Space and Information Systems Division of Downey.

Primary goal of Spacecraft 011's mission will be to gather additional data on the Apollo heat shield to supplement that obtained in the February 26 flight of Spacecraft 009, the first flight-type Apollo launched into space.

While 009 proved the heat shield was adequate under a high heat re-entry velocity (approximately 26,500 feet per second), Spacecraft 011 is scheduled to re-enter the earth's atmosphere on an elongated trajectory to produce a higher, total heat load.

Packing of the Earth Landing System for Spacecraft 011 has recently been completed by a team of Northrop Ventura experts at Cape Kennedy.

This marks the last time, under present plans, that the packing will be performed at the Cape. Apollo parachutes will now be packed at Northrop Ventura's Conejo Valley facility and shipped to nearby Downey for installation on the vehicle. The spacecraft will be ready for launch when it leaves North American.

The new arrangement will result in considerable savings for the Apollo program.

Four other earth landing systems, using the Block I configuration, have been completed and delivered by Northrop Ventura. The Division is presently at work on the first Block II configuration.

High Altitude Chute Test Set by NASA

Three Northrop Ventura parachutes — Ringsail, Annular and Wagon Wheel—which are under consideration for landing space capsules on Mars will be tested this summer at an altitude of about 130,000 feet, where the earth's atmosphere most closely simulates that of Mars.

The project will be carried out by NASA in cooperation with Jet Propulsion Laboratory, manager of the Voyager spacecraft program to put an unmanned instrument package on the planet early in the next decade.

The project announcement follows recommendations presented March 29 by Northrop Ventura's R. N. Worth at a three-day AIAA meeting in Baltimore on "Stepping Stones to Mars."

In his paper, Mr. Worth, who is project manager of Planetary Landing Systems for Ventura Division, said:

"An evaluation of existing programs and configurations shows a meager amount of test data in the required operational regime. The parametric data generated to date is based upon analytic efforts extrapolating our present knowledge in an earth atmosphere environment into the postulated Mars environment. While many isolated test data points have been used to support this extrapolation, the fact remains that there are no tests that encompass at one time the requirements of large parachutes, high Mach number deployment at low dynamic pressures in a low density environment, and descent at extremely low canopy loadings with relatively high descent velocities.

"A substantial number of tests must be conducted at altitudes (See VOYAGER, page 6)

Nortronics' Vigicon To Display Satellites

Northrop Nortronics will produce a large screen information display system for satellite control at the Air Force Eastern Test Range Control Center, Cape Kennedy.

The dynamic data projection system will be the second built by Northrop's Nortronics Division for the new Air Force control complex, which is undergoing continuous expansion to enlarge its mission to include global operations as well as improve its capability for all elements of the Eastern Test Range.

The new system will be used exclusively to trace, on a screen approximately eight-foot square, the launch and orbital paths of satellites. It will be similar to the Northrop system currently in operation at the center which displays over-all range control functions, including missile tracking.

Utilizing Vigicon scribing projectors developed by Northrop (See VIGICON, page 6)

PARACHUTE FABRICATION

It's Not a Job for Just Any Housewife

"You might expect a housewife familiar with sewing to step right up to the industrial machines and techniques used to make parachutes for spacecraft recovery and go to work," says Mrs. Florence Johnson, "but that just isn't true."

Mrs. Johnson, now a Northrop Ventura production planner for parachutes and related items, came to the Division in 1954 to help establish the research and development parachute fabrication facility. She has played a key role in production of landing systems for Mercury, Gemini and Apollo

spacecraft.

"The only resemblance between parachute fabrication and home needlework is the basic knowledge of sewing and the home sewing machine. The women working here in the Parolab had to go through a thorough training so they could work with military specifications and engineering drawings," she continued.

One of the women in the Parolab, Maydeen Garrison, also worked on the first spacecraft recovery chutes, during the Mercury program.

Techniques today are basically the same as in the pioneering days, Mrs. Johnson says, with the most significant improvement coming in pattern development.

However, as America's space program moves beyond the era

of earth orbiting and looks to interplanetary travel, the entire spectrum of parachute system design, development and production is considering new concepts.

Mrs. Johnson is no different. Chances are if you dropped in to see her, she'd be reading the latest technical dictionary on textiles.

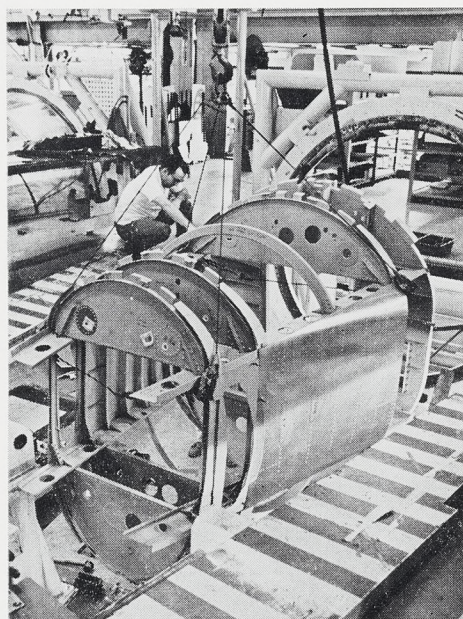
"The technology of paradyamics has developed very rapidly in the last few years," she says.

"Throughout American industry, both paradyamics and others, a new respect has risen for textiles, their present applications and their potential. This happened when the synthetic fabrics such as nylon came on the scene, replacing the agricultural prod-

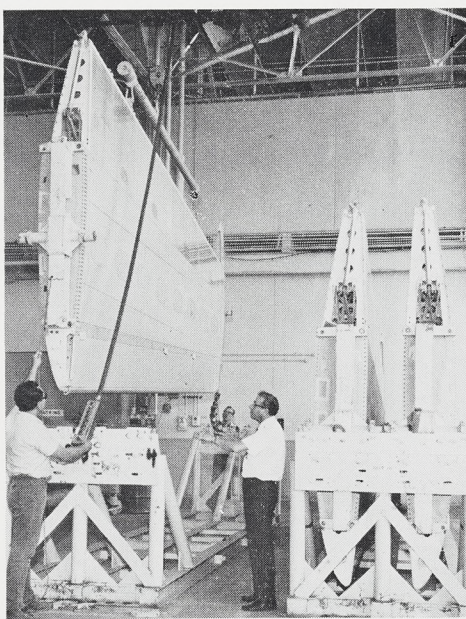
(See FLO JOHNSON, page 6)



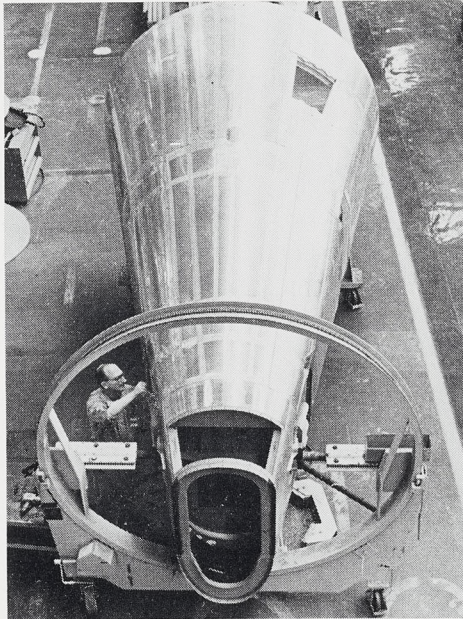
Mrs. Johnson



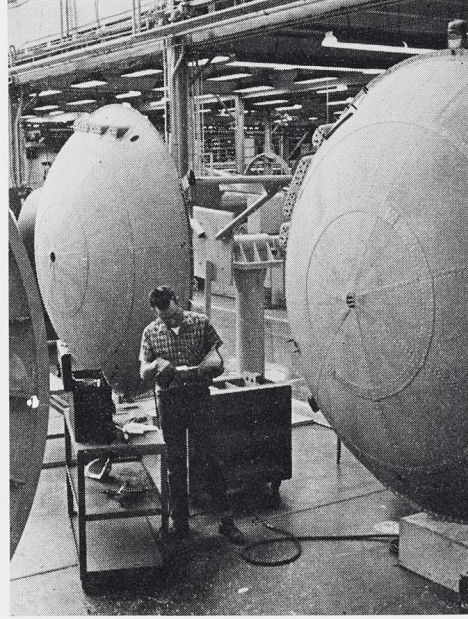
Main or "A jig" is among first assembly steps for Boeing 707 aft fuselage sections, here being loaded by Isaac Langley.



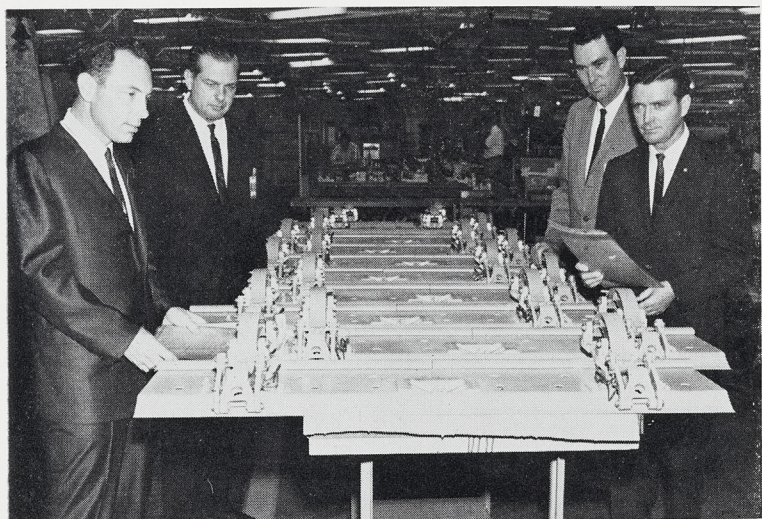
Foreman J. L. Warner (right) gives signal and another wing section is lowered into transportation fixture by Ralph Gonzales and James Black.



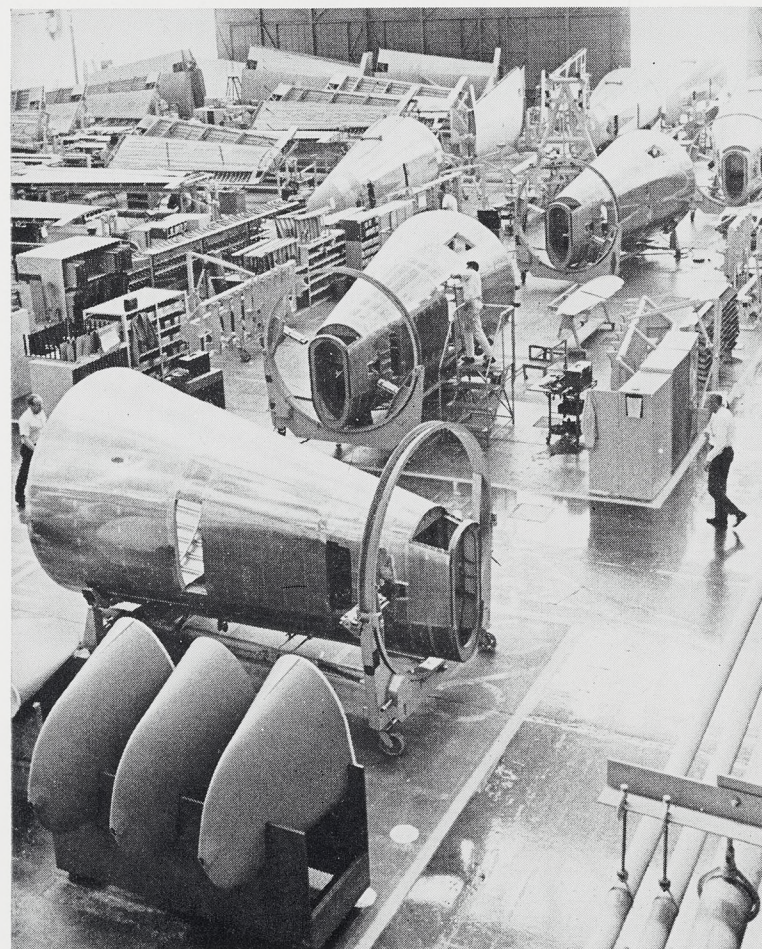
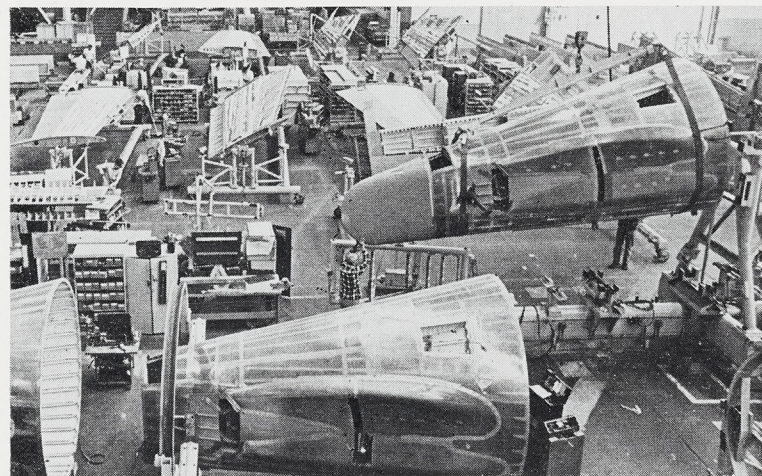
Rotating fixture enables John Tye to perform work on aft fuselage section from floor level. Section above is inverted.



Pressure bulkheads for aft fuselage form back-drop for Theo Hampton as they near completion on special assembly fixtures.



Boeing-Northrop working relationship, matured over a 10-year period, is best pictured in individuals. Boeing's Fred Walker and Jim Thomas (foreground) are resident Boeing representatives at Norair where they work closely on day-to-day basis with men like Bill Minner (left background) who heads Boeing program production effort and Ted Hallett who supervises some Quality Control efforts involved.



THE BOEING LINE

125 Miles of Big Jet Structures

Imagine jet aircraft components laid end-to-end forming an unbroken line from Hawthorne to Bakersfield, a distance of over 125 miles. Unimpressed?

Then try this one: \$238 million or the equivalent of more than \$28,900 for each man and woman currently on Northrop Norair payroll.

Either illustration, or both, would be applicable in describing the scope and value of subcontract work Northrop Norair has performed for the Boeing Company in support of its large jet aircraft programs.

Initial phases of this work began more than 10 years ago. Current efforts are programmed to continue over at least the next three years. This work, of course, is in addition to the work Northrop Norair will perform on the giant Boeing 747.

This subcontract capability, an important adjunct to Norair's diversified operations, certainly holds some sort of "senior" status for its long duration. Products and projects have come and gone during the period, but this effort continues unabated.

It highlights a close and harmonious working relationship between Boeing and Northrop that spans more than two decades. During World War II, Northrop fabricated B-17 bomber components under subcontract to Boeing. This was followed by production of wing flaps for Boeing's B-50 bomber and the C-97 transport-tanker version of the same aircraft.

"We regard our efforts as an extension of Boeing's production capability," said Jack Manion, manager of Manufacturing and Materiel. "In attitude and in reaction we respond like Boeing management."

Northrop currently fabricates outer wing assemblies for right and left wings and aft fuselage sections for Boeing. This work has ranged through all military (called the KC-135) and

commercial (the famed 707) versions of Boeing's big jets.

Initial contracts were issued in 1955 calling for Norair to produce 29 ship sets of outer wings for the KC-135. Other contracts followed until Norair had produced 820 ship sets when the program phased out about a year ago.

From early 1957 through December 1964 Norair also fabricated 781 aft fuselage sections for the KC-135 program.

As Boeing moved into production of commercial 707's in various configurations, Northrop assumed responsibility for manufacture of both outer wing and aft fuselage components. From May 1956 through March 1966 more than 500 ship sets had been turned out.

Late last year a gradual acceleration in production rates began on this commercial program. From a rate of five and one-half ship sets per month, Norair is stepping up activities and by July will be turning out 10½ ship sets per month.

(By way of comparison, peak production of KC-135 components saw 20 ship sets per month fabricated.)

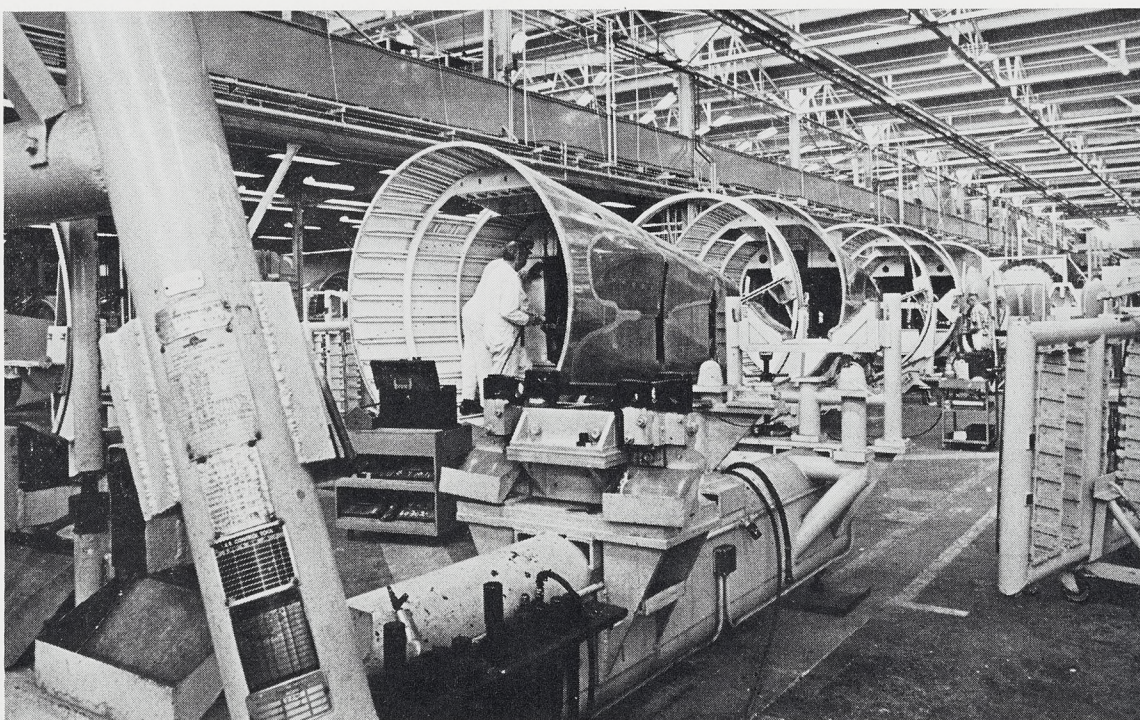
With its increased production, Norair is currently more deeply involved in fabricating commercial aircraft components for Boeing than ever before.

Another important contribution over the years has been in the production of spares for Boeing.

While enjoying an enviable reputation for on-schedule production in all phases of the program, Norair has also received many plaudits for its ability to meet emergencies involving spares.

For example, most employees recall a now-famous incident in which a commercial 707 lost a large section of outer wing as the result of a mid-air fire, yet landed safely. A hurried call for replacement components reached Nor-

(See BOEING LINE, page 5)



Final assembly area (left photos) shows aft fuselage sections and outer wings moving toward completion. Aft fuselage sections (above) move along line, each riding on

its own assembly fixture which serves as work station and also transportation device.

OUR NIGHT AT DISNEYLAND

Entertainment Bargain of Year

The family entertainment bargain of the year—unlimited use of the "magic kingdom" of Disneyland for a single price—is once again available to Northrop folk.

The date is May 27 and the occasion is Northrop Night at Disneyland.

Northrop Recreation Clubs at Norair, Ventura and Northrop Divisions are pooling talents to make the event possible.

They have, as the date indicates, scheduled the night on the eve of the long Memorial Day holiday period. And it

means Disneyland will feature some added attractions as part of the usual holiday package.

For instance, among name bands and orchestras to be featured are those of Harry James and Xavier Cugat, plus Anita Day and a host of other surprise guest stars. They will be appearing at popular points within the magic funland.

But to the average family, a key point in NRC-sponsored night is the price—just \$3.95 per person with children under three admitted free. And the price opens the doors to any and all Disneyland attractions,

including the main gate. In short, once the original ticket is obtained everything else is free. There are no additional charges for rides, admissions, entertainment or anything, exclusive of shooting galleries. Northrop families can ride any attraction, see any show, or visit any feature again and again without further charge. It is a magic key to a magic kingdom.

To make this possible, the general public is cleared from Disneyland prior to 8 p.m. From that time until 2 a.m. the park is just for Northrop families and their guests.

Northrop Night at Disneyland is now a traditional affair heralding the arrival of summer. But since the last night there, many attractions have been added. For instance, there is, direct from the New York World's Fair, the feature "Great Moments with Mr. Lincoln." There are also added attractions for the very young. Only a personal visit can confirm what and where they are.

Northrop folk may obtain Disneyland tickets from all NRC ticket outlets.

Al Pearson Wins Auto In Charity Drawing

For a man who heads a family of eight, Albert Pearson probably couldn't have won a more appropriate prize than a nine-passenger station wagon.

The Northrop Ventura branch engineer, assigned to the Engineering Laboratory, recently won a prize at the Mystical Rose Council spring festival, a fund raising campaign sponsored by the Knights of Pythias in Thousand Oaks.

Mr. Pearson's prize was won by a drawing.



Helen Pelke, Northrop Hawthorne IBM operator, is being sponsored by Knights of Columbus as candidate for Hawthorne Fair in July. Pert Miss Pelke could win \$1500 prize, plus expense-paid trip for two to Europe, if she wins top honors. Votes are based on ticket sales.

Solfeggietto, Computer Earn Honors for Youth

The age-old conflict between science and culture certainly isn't affecting 11-year-old Jimmy Celoni, whose Dad, Jim, works in Boundary Layer Research at Northrop Norair.

The Torrance lad was top winner recently in the Junior Division, South Bay Exchange Club's annual "Search for Talent" contest. A pianist, he performed *Solfeggietto* in C Minor and *Rondo a la Turque*.

For winning the talent contest, he earned the right to compete in the District finals at Redondo Beach.

Jimmy also received the first place award (physical category) in the Carl Steele Elementary School Science Fair by building an analog computer.

His computer will be entered in the Torrance Unified School District Science Fair, representing Carl Steele Elementary School.

MANAGER'S POST AT CAROLINA GOES TO JACK BEATTY

J. S. "Jack" Beatty has been transferred from Northrop Norair to a new post as manager of Business Administration Operations for Northrop Carolina.

Since joining Northrop in 1952, Mr. Beatty has held a number of important positions with Contract Administration functions, including his last assignment as director of Aircraft Contract Administration.



Mr. Beatty

Mr. Beatty holds a BA degree in Economics and an LLB degree from the University of Cincinnati. He is a former Air Force navigator and was engaged in the practice of law prior to joining Northrop.

At Northrop Carolina Mr. Beatty will be responsible for Contract Administration, Pricing, Accounting and Financing, Data Processing and Industrial Relations.

A. H. "Andy" Anderson has been named to succeed Mr. Beatty as director of Aircraft Contract Administration at Northrop Norair by Paul H. Champion, manager of Contract Administration.

Joining Northrop in 1942, Mr. Anderson moved up through a succession of responsible positions in Materiel, Special Weapons department (Snark) and Contract Administration. He has recently served as chief of Administrative Services for the Site Activation department, then as general supervisor and more recently as chief of T-38 and Advanced Systems group of Contract Administration.



PLANNING A BIG NIGHT—Eleanor Heldt, Disneyland director of group sales, and Norair's Dick Pryor, use huge map of the "magic kingdom" to plan all Northrop night there May 27. Unlimited use of all attractions, from 8 p.m. to 2 a.m., will be possible with \$3.95 ticket now available through Northrop ticket outlets. Harry James and Xavier Cugat will head entertainment.

LEADERS IN THEIR PROFESSION

The Skinner Brothers: A Twin Triumph Over Handicap

One of the most unusual ceremonies in the history of Northrop service awards took place recently and brought to light an inspirational story of two men's personal triumph over a handicap they have shared since birth.

Roger and Robert Skinner, the personable twins whose smiling faces are a familiar sight around Northrop Norair's Engineering and Science Center, received their 20-year service pins from Paul Wierk, Corporate director of Management Information.

Presently senior scientific programmers in Northrop's Data Processing department, both men have been deaf since birth.

"The 20-year pins these men wear in their lapels not only symbolize the growth of data processing in our dynamic industry, but symbolize a personal victory over their handicap," Mr. Wierk said. "They have done what few people could ever hope to accomplish under similar circumstances: they have become leaders in one of our newest and most demanding professions."

The men's deafness is certainly no handicap when it comes to their job. They are skilled artisans at lip reading and grasping their assignment very quickly.

R. N. Kandalaft, engineering specialist in Norair's Flight Mechanics branch, commenting on a recent assignment Roger and Bob did for him, said:

"Their work on a six-degree-of-freedom problem involving differential

equations of motion was outstanding. They are excellent programmers—the best here or anywhere else."

The twins were only a year out of Tri-State College in Indiana, each with a degree in aeronautical engineering, when they joined Northrop in 1946. They started their careers as mathematicians in the Stress Analysis group which, at that time, was working on the famed "Flying Wing."

In 1950 Roger and Bob put their math and engineering backgrounds to work for Northrop's budding data processing organization. In that era of the BINAC and the "plug board," the twins were classed as computer oper-

ators, a breed of people who were the first programmers.

Today, the twins like to think of themselves, professionally, as programmers rather than mathematicians or engineers.

In the intervening years the Skinners contributed to the development of the F-89 interceptor series, the T-33 and F-5, and the Laminar Flow Control experimental airplane.

For the latter, Roger journeyed to the Cornell Aeronautical wind tunnel in Buffalo, New York, in 1962, to perform computer studies and data reduction, while Bob was providing programming

support to Jet Propulsion Laboratory on the Block IV Ranger program.

"Their personnel files are full of commendations," says Bob Mullings, their supervisor in the Scientific & Engineering Programming group. "I hope they'll stay around another 20 years."

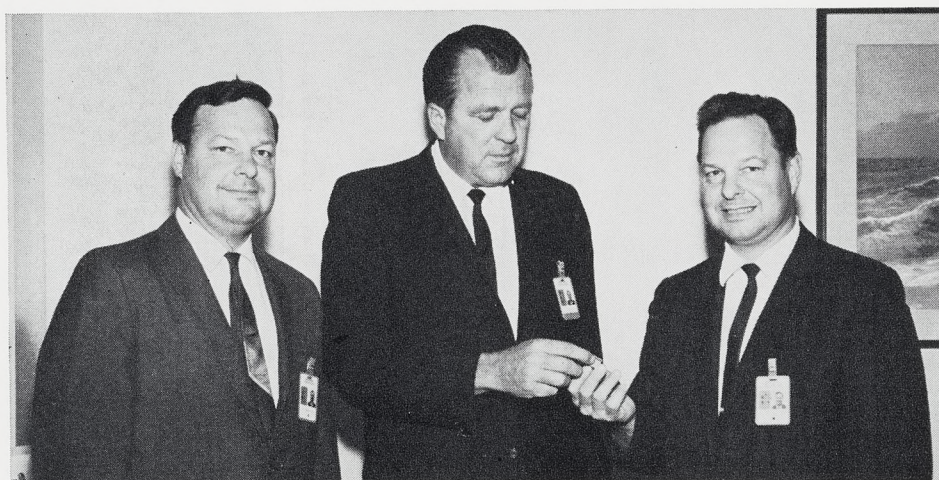
The twins and their families are neighbors, making their homes in Northridge. Bob is teaching an evening extension course on "Introduction to Data Processing" to a group of deaf adults at San Fernando State College. Both men have taken graduate mathematics and computer courses at UCLA.

In their efforts to help others with similar handicaps, the twins are both officers of the Far West Athletic Association of the Deaf, one of seven regions comprising the American AAD. Bob is president and Roger is secretary-treasurer.

The AAAD is an organization to promote sports activities among deaf clubs across the country. It was organized in 1945 and now numbers 115 different clubs in the U.S.

This year the Los Angeles club basketball team won the Far West region title over 16 other clubs in California, Nevada and Arizona and went on to win the national championship in Boston. Bob took his vacation at that time in order to accompany the team.

Although no longer active players, the brothers are avid basketball fans. Both played on a Northrop team which won the 1954 inter-plant championship.



UNUSUAL CEREMONY—Bob Skinner (right) and his twin brother Roger flank Corporate Director of Management Information Paul Wierk during 20-year service pin presentation to Bob recently. Roger will receive his 20-year pin in June.

AD ASTRA PER ASPERA

A Look at Underseas Propulsion

By the NORTHROP NEWS Staff

One of the members of the Deep Submergence Program staff at Nortronics Anaheim tells us there is a saying circulating among marine sciences specialists to the effect:

"The ocean's bottom is more interesting than the moon's behind."

While Northrop is equally interested in space and the earth's ocean reservoirs, no one can deny that there has been a recent shift in public attention from outer to inner space. This is especially true in California which has more ocean frontage than any other state.



Mr. Thurston

According to Sid Thurston, chief of the Advanced Underwater Systems group at Northrop Norair, there is a need for many types of undersea vehicles to exploit and control the wealth of the oceans, and an even greater need to improve our knowledge of propulsion and hydrodynamics which is now in its infancy.

Mr. Thurston last month was chairman of a symposium in Los Angeles designed to bring together the latest information on both these aspects of marine sciences.

Sponsored by the American Institute of Aeronautics and Astronautics, the symposium was divided into two sessions—one on hydrodynamics and propulsion of underwater vehicles and another on proven utility of undersea vehicle systems.

A survey of marine propulsive devices by Dr. T. Wu, professor of applied mechanics at California Institute of Technology, included such advanced concepts as propellers in ducts which operate on a principle similar to a modern jet engine.

Others, which operate in large bubbles or cavities, function in many ways like supersonic airfoils.

Under serious consideration also, Dr. Wu said, is using two large propellers at opposite ends of a submarine, giving a control very similar to that of a helicopter and a net thrust in any desired direction.

Reducing hydrodynamic drag, which is one of the most exciting programs in the marine sciences, was discussed by Dr. J. Hoyt, head of the Research Division of the Naval Ordnance Test Station in Pasadena.

Dr. Hoyt has been conducting pioneering work in reducing hydrodynamic drag. As drag is reduced, a vehicle can either go faster or can increase its range of operation on the same amount of power and fuel.

He has been using chemicals added within the boundary layer to change the nature of the water flow around the body. Dr. Hoyt described his development as one of three major concepts for reducing drag.

He mentioned Northrop's efforts to control the boundary layer by suction through slots (the same concept employed in Northrop's Laminar Flow Control experimental aircraft, the X-21).

The other concept, advanced by North

American Aviation, involves control of the shape of the vehicle.

"These techniques all act to change the flow in the boundary layer and therefore reduce the drag," Dr. Hoyt said. "Future marine craft will use these concepts for attaining high speeds and long ranges."

Other papers presented covered powerplants for underwater propulsion of small bodies and an analysis of the porpoise as a model for study of the undersea environment.

Dr. Andreas B. Rechnitzer of North American, Inc., was chairman of the afternoon and evening sessions on underseas vehicles.

Mr. Thurston, who served as chairman of the morning session as well as over-all symposium chairman, is himself a major contributor to our knowledge of hydrodynamics and propulsion. His activities cover 20 years and include some of the first successful axial flow pump jets (jet propulsion systems) for marine vehicles; soluble coatings for reduction of hydrodynamic drag; and unique types of turbine powerplants for underseas vehicles.

PEOPLE IN THE NEWS

William Coffey, Northrop Norair process analyst in Quality Control, was special speaker at a Quality Control workshop staged by the Metal Finishing Industry April 23 at Rodger Young Auditorium in Los Angeles . . . D. J. Harnett, Corporate director of Contracts & Pricing, was a session moderator and chairman in Los Angeles at the annual symposium on government contracts sponsored by National Contract Management Association. The April 15-16 symposia were held concurrently in Los Angeles and Washington, D.C.

Dick Hoffman, head of Public Relations at Northrop Nortronics, is a member of the Public Relations committee for the 1966 Western Electronic Show and Convention (WESCON) scheduled August 23-26 in Los Angeles . . . Bernard Gaiennie of Norair Manufacturing R&D presented paper on "Joining Methods With Emphasis on Diffusion Bonds" at National Aeronautic Meeting and Production Forum of the Society of Automotive Engineers in New York.

Howard F. Marx of Norair Marketing was lecture series chairman for four sessions on cost effectiveness at the AIAA's Los Angeles section. He was moderator of final panel discussion April 27.

Honeycomb panels brazed with titanium-based alloys was the subject of a recent paper presented by L. H. Stone and R. E. Herfert at the American Institute of Metallurgical Engineers annual meeting in New York . . . B. A. Tueling, chief of Avionics and Weapon Delivery group at Norair, has been nominated as an official of the greater Los Angeles Chapter of the G-AES for the 1966-67 administrative year.

A. H. Freedman and Dr. E. B. Mikus discussed brazing of Columbium honeycomb structures at the American Welding Society's 47th annual Meeting and Exposition in Cleveland, Ohio, last month . . . Dr. W. B. Fallis was coordinator of a recent symposium on advanced unmanned deep space missions at the Los Angeles AIAA.



BEST INDUSTRIAL ADVERTISING—Northrop Advertising Manager Ward Lauren and assistant, Marie MacDonald, admire Sweepstakes Trophy won by Corporate advertising campaign in competition held by Association of Industrial Advertisers. Ads shown won first place in trade magazine category plus best over-all.

NORTHROP AD CAMPAIGN WINS TOP HONORS IN AIA COMPETITION

Northrop's Corporate advertising campaign for fiscal 1966 won top honors as the "most outstanding entry" in the 10th annual competition of the Association of Industrial Advertisers (AIA) held in Los Angeles last month.

The company's campaign initially was awarded first place in the category of Trade Publication Advertising — Black and White. A Certificate of Achievement was presented at the AIA annual banquet to signify the honor.

Following the category awards Northrop was given a handsome trophy representing the Sweepstakes Award for the best over-all entry in the competition.

Five individual advertisements were entered to represent Northrop's "corporate capabilities" campaign for the current year. The ads described the following subjects: Northrop Ventura's Cloverleaf parachute; Northrop Nortronics' Vigicon information display system; the new GR-G5 gyroscope produced by the Precision Products department of Northrop Nortronics in Massachusetts; the company's work in spacecraft landing systems and research vehicles at Northrop Norair and Northrop

Ventura, and the navigation system for the C-5A to be built by Northrop Nortronics.

A total of 262 entries were submitted by companies from Chicago to the west coast, according to AIA. Among the local aerospace companies with which Northrop's advertising campaign competed were North American, Litton, Marquardt, Douglas, Lear-Siegler, Hughes Tool, Hughes Aircraft, TRW, and a number of smaller companies.

Other major industrial advertisers included Philco, Union Pacific, Sterns-Rogers, Aeroquip, Signal Oil, Motorola, and Ampex.

Northrop's advertising program is directed by Norman Warren, Corporate director of Public Relations and Advertising. Advertising manager is Ward Lauren. The company's advertising agency is Doyle Dane Bernbach, Inc.

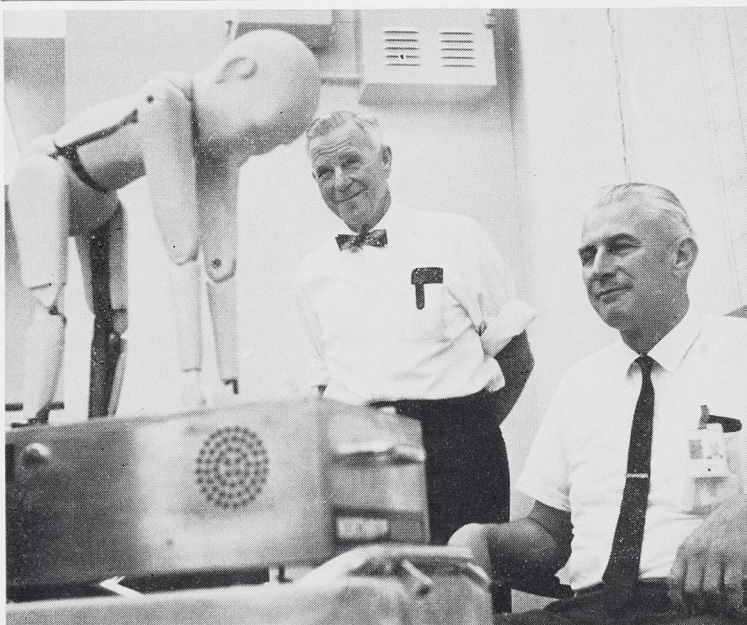
NRC Considers Trip To Canadian Exhibit

Northrop Recreation Club is considering sponsoring a visit to Expo 67, the popular name for the 1967 Universal and International Exhibition which will run for six months next year in Montreal.

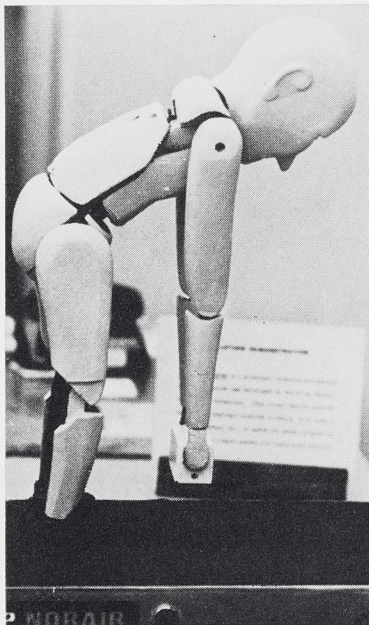
The Exhibition is being planned as a highlight of the 100th birthday of the Canadian Confederation. "First category" status was awarded Expo 67 by the International Bureau of Exhibitions, which puts it on a higher level of recognition worldwide than even the New York World's Fair.

Northrop employees attending the Exhibition might find some old friends there, since Northrop now maintains offices in Montreal in connection with the Canadian F-5 program. The CF-5 will be produced in Montreal by Canadair, Ltd., through a licensing agreement with Northrop.

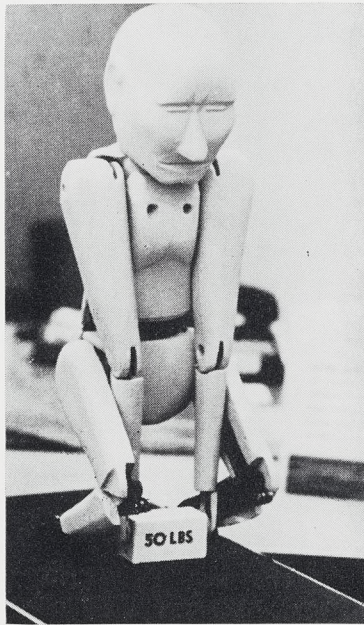
The Canadian Government has invited some 150 countries and international organizations to participate in Expo 67. Its theme is "Man and His World."



ANIMATED SAFETY SALESMAN — Harry Barnett (center) and George Putnam patiently wait while Lifty Louie, a mechanical man designed to illustrate manual lifting techniques, goes through demonstration of wrong way to lift weight (left and center photos). A few seconds later, Louie does it the right way (right photo). Mr. Barnett, of Advanced Production at Northrop Norair, designed and



built the device in his spare time. Mr. Putnam, of Norair's Safety branch provided the tape-recorded dialogue for the 90-second demonstration. Louie made his debut at the recent 13th annual Western Safety Congress and Exhibit in Los Angeles. Another highlight of the Congress was a presentation by Zero Defects Program Director D. N. Petersen on the ZD program at Norair.



Classified

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private business are not accepted. The Northrop News reserves the right to edit or omit ads. Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

For Sale

Lawnmower, Craftsman, power, reel-type, 3 yrs. old, \$30. Hollydale, ME 3-2395. A

Volvo, 1958, \$175. Inglewood, 674-1885. A

Ford, 1956 convt., \$175. Manhattan Bch., 379-2649. A

Pup, Weimaraner, AKC reg., 11 mos. old, \$50. Gardena, 324-7442. A

Boat, 25', 20 scoop tank, \$1500. Hawthorne, OS 5-7729. A

House, 3-bdrm., 2-bath, view of city, walk to grade school & shopping, new drapes & carpeting, \$32,950. Torrance, DA 5-5245. A

Home, 2-bdrm., in Westchester, lge. lot, dble. gar., near schools, shopping, 5 1/4% FHA loan, low dn., \$23,850. L.A., 645-5169. A

Acreage, near Willow Springs, in Antelope Valley, E. Kern water dist., 5 to 20 acres, \$495 acre. Torrance, FR 8-1026. A

Surfboard, orig. cost \$100, \$75. Box 901. A

Printing Equipment, compl. small shop incl. 8" x 11" power press & 12 cases of type, \$375. Lawndale, 370-3821. A

Auto Evaporator Cooler, North Air, 2-spd. motor, floor mount, holds 4 gal. of water & ice, \$15. Hawthorne, OS 9-8644. A

House, 2-story, 4-bdrm., 2-bath, near schools & shopping, \$27,500. Torrance, 375-6071. A

Dinette Set, black & gray, \$25. Redondo Bch., 376-8545. A

Buick Special, 1958, auto., 2-dr., \$350. Torrance, 371-3278. A

Impala Super Sport, p/b, p/s, w/w tires, auto. trans., \$2135. Placentia, 714-524-0938. A

Ford Mustang, 1965, p/s, p/b, air cond., new tires, \$2250. Long Bch., HA 5-6816. A

Chevrolet Biscayne, 1961, 6-cyl., auto. trans., r/h, \$590. Inglewood, 678-1621. A

Chevrolet, 1950 convt., new brakes, clutch, \$125. Torrance, 328-3205. A

Baby Crib, \$5. No. Redondo, FR 4-0225. A

Ford Truck, 1/2-ton, 1956, 6-cyl., \$350. Inglewood, PL 1-0787. A

Radio Equipment, amateur-type SX 111 receiver, Knight 150 A transmitter, Heath Kit mobile, sell separately or \$300. Hawthorne, 676-6550. A

TV, Zenith, 23" Golden Video tuner on movable stand w/UHF converter, 2 yrs. old, orig. price \$260, \$125. Gardena, 327-8615. A

Dining Room set, walnut, table & 4 chairs, custom pads, 2 extra leaves, \$20. Lawndale, OS 5-7316. A

Karmann Ghia, 1958, new tires & battery, \$525. Long Bch., 397-7552. A

Sunbeam Alpine Roadster, 1955, eng. & trans. recently rebilt., new tires & clutch, \$400. Inglewood, 672-6188. A

Accordion, 120 bass La Scala, model 7432 TD, white, \$350. Culver City, 836-4934, UP 1-0999. A

Washer & Dryer, Hamilton, dryer 220 v, convert to 110 V, \$75 ea. or both for \$140. Torrance, FA 8-0847. A

Surfboard, Greg Noll, 8', \$65. Torrance, 371-1125. A

Lot, in Mason sec. of Forest Lawn Cemetery, \$300. Hawthorne, 676-2613. A

Piano, spinet, Hallett & Davis, \$350. Torrance, DA 6-7232. A

Bedroom Set, walnut, queen size bed, mattress, box springs, bookcase headboard, extra lg. dresser w/mirror, \$125. Inglewood, 672-7424. A

Corvette, 1956, 1963 327 eng., chrome wheels, 1-4 barrel, \$700. Rolling Hills Ets., 375-6764. A

Chevrolet, 1955 station wagon, \$50. La Crescenta, 249-9387. A

House, 3-bdrm., bltins, burch cabinets, bltin TV/Hi-Fi area, raised fireplace, 500 sq. ft. playroom-workshop, 2 1/2 car gar., fruit trees, walking dist. to shops, 20% dn., \$27,250. Alhambra, AT 4-5698. A

Table Saw, 8", tilting arbor, \$50. Anaheim, 714-776-3939. A

T-Bird, 1956 h/top, fresh o/haul, paint & tires, auto. trans., orig. owner, \$1275. Pac. Palisades, 454-2057. A

Mustang, 1955, 6-cyl., stick shift, r/h, w/s/w, \$2095. Rolling Hills Ets., 673-1097. A

Watch, Elgin Embraceable, 2-diamond, waterproof, shock proof, 19 jewels, in case, guarantee, \$40. Gardena, 327-0662. A

Bar, custom-made, 6' long, 3/2" high, 1 1/2" wide curved formica top, 4 mahogany-frame stools, cost \$300, \$150. Redondo Bch., FR 6-6415. A

Condominium Home, 4-bdrm., 2 1/2 bath, bltins, washer, dryer, refrig., air cond., pool, rec. bldg., enc. patio & planting area, children & pets OK, terms, \$24,995. Anaheim, 635-1686. A

Dinette Set, chrome, light gray marbelized w/4 chairs, \$50. Inglewood, PL 4-4052. A

Hub Caps, set, for Mustang, \$10. Wilmington, TE 5-9070. A

Bassman Amplifier, Fender, Fender Strato-castor guitar, Gibson reverb. amplifier, 1-yr. old, \$400. Manhattan Bch., 372-7441. A

For Sale

House, Del Air area, 2-bdrm., paneled beamed ceiling, den w/fireplace, 3-car gar., alum. siding, 50x175 lot, close to Northrop, \$24,000. Inglewood, 676-2958. A

TV, Admiral, 23", radio, stereo comb., walnut cabinet, 1962 model, completely adjusted, \$200. Hawthorne, 675-4202. A

Pup, collie, male, 6 mos. old, AKC reg., champion stock, \$100. Fountain Valley, 714-952-4743. A

Range, gas, 36" oven, grill on top, copper, \$95. Wilmington, TE 4-8771. A

Swimming Pool, 24' x 48' Doughboy, filter, vacuum & testing equip., \$250. Torrance, 370-8958. A

House, 3-bdrm., 2 baths, 24x14 liv.-dining comb., 2-car detached gar., newly painted, range, washer, dryer, air cond. avail., \$2500 dn. to take over 5 1/4% GI mortgage, \$23,900. Gardena, 329-3563. A

Camera, Nikon 35 auto., never used, incs. wide angle & telephoto lenses, cost \$300, \$120. Box 902. A

Stove, white, O'Keefe & Merritt, gas, grill in middle, \$50. Inglewood, OR 1-9320. A

Ford, 1955, 2-dr., auto. trans., r/h, \$85. Torrance, 835-5708. A

Ice Skates, women's, size 7, w/guards, \$15. Manhattan Bch., FR 9-7490. A

Exercycle, Vita-Master, 18 mos. old, \$100. Hawthorne, OS 5-2772. A

Encyclopedia Britannica, book case & year books, \$125. Bellflower, TO 7-4362. A

Stereo Hi-Fi Components, AM/FM tuner, dual amplifiers, dual preamps, dual cross-overs, 4 speakers, stereo turntable, \$70. Hawthorne, 676-0418. A

Outboard Motors, 25 hp Evinrude & 7 1/2 hp Scott, \$185. Gardena, DA 4-8853. A

Drapes, lined, floor to ceiling, 12' wide, orange, red, gold, \$22. Box 903. A

Stove, Western Holly, gas, 36", griddle & broiler, \$25. Torrance, DA 9-3721. A

Apt. Bldg., 9 dly. units, 3-bdrm., owner's unit, \$12,500 yearly gross, No. Inglewood area, \$105,000. Torrance, 325-9832. A

Wardrobe Chest, baby's, walnut finish, 4-dwr. plus pullout clothes hanger rack, \$20. Thousand Oaks, 679-5521. A

Mercury, 1955, 4-dr., Monterey, a/t, p/s, r/h, w/rear speaker, \$100. Compton, 635-9082. A

Radio Equipment, amateur-type, Lafayette model KT 200 receiver 550 kc to 30 mc in 4 bands, Lafayette model TE20 RF signal generator 120kc to 260 mc, RCA senior volt ohmyst ac-dc vtm, many electronic comps., \$80. Torrance, 835-2367. A

Furniture, Salem maple & birch maple, coffee table, lge., cost \$65; \$40; end table set, 2-tier, \$35, other items various prices. Long Bch., 433-0861. A

Porsche, 1965, 356 c coupe w/chrome wheels, AM radio, SP tires, \$4350. La Habra, 691-9534. A

Radio, 21" Silvertone, floor model, \$40. Inglewood, 674-0755. A

Tires, 5 Allstate Supertred, 9.00x15 4-ply, nylon tubeless, w/wheels, \$75. Torrance, 376-4771. A

Chevrolet Bel Aire, 1957 convt., Powerglide, p/s, p/b, r/h, full tonneau cover, \$495. Pasadena, 682-1450. A

Guitar Amplifier, Silvertone, 3 inputs., 12" speaker, 3 mos. old, 1-yr. guarantee, \$60. Gardena, DA 4-7259. A

Beaded Bag, handmade in Europe, blue beads & velvet drawstring, \$5. P.V. Pen., FR 8-1863. A

Pure Honey, sage or buckwheat, 2 lbs. \$1.00 or 5 lbs. \$2. Long Bch., GA 2-8829. A

Encyclopedia Britannica Junior, 20 vols., 1957 edition, \$20. San Pedro, TE 3-9430. A

Chevrolet, 1959, h/top, 55,000 mi., orig., \$575. Lomita, 325-9033. A

Transceiver, C B handheld, Heathkit mod. GW 21, 102" whip antenna compl. w/bumper mount, \$25. San Pedro, 833-2301. A

Falcon, 1961, 2-dr., r/h, auto. trans., \$650. Hawthorne, 675-7969. A

Valiant Signet, 1962, 50,000 miles on car, 13,000 on eng., r/h, b/seats, newly retreaded tires, \$800. San Pedro, TE 3-9264. A

Volvo, 1959, 1961 eng., new paint & headliner, chrome wheels, record player, \$500. Lynwood, NE 1-9322. A

Honda, 1965, 160cc, 1744 miles, incs. access., windshield, saddle bags & turn signals, \$500. Torrance, 371-7629. A

Engine, frame, tires & parts for Allstate compact motorcycle, eng. needs work, sell separately or \$50. Inglewood, 676-8982. A

Wheels, 5 American mags, 5 sports car 200 tires, fit any Corvette or Chevy, w/without disc brakes, size 650-670x15, \$250. Hawthorne, OS 5-1365. A

Duplex, 2-bdrm. ea., 1800 sq. ft., 2 miles from Northrop, \$26,950. Gardena, 324-5086. A

Car Cooler, Bon-Aire water-cooled, 12 volt, fits floor board hump over trans., incs. 110 volt transformer to use unit in home, \$25. Torrance, DA 9-2047. A

Clarinet, Dumont, w/case, \$75. Harbor City, 326-8033. A

Coins, 1964 Kennedy proof sets, \$12 per set. L.A., 939-3519. A

Piano, upright, Howard, \$75. Hawthorne, OS 5-5498. A

House, 4-bdrm., family rm., 2 1/2 baths, 1 acre, horses OK, near Northrop Ventura, \$35,000. Somis, 805-482-1186. A

Ford Falcon, 1960, 4-dr. sedan, auto. trans., \$195. L.A., 628-3990. A

House, 4-bdrm., 1 1/4 bath, f/p, FA heating, bltins, block wall, 2 patio slabs, near schools, fwys., 5 1/4% FHA, \$23,850. Garden Grove, 714-892-5450. A

For Sale

Guitar, Fender Malibu, Spanish-style, flat wound strings, elec. guitar neck, 6 mos. old, w/case, \$200. P.V. Pen., FR 8-2810. A

House, 3-bdrm, 1 1/4 bath, bltins, dishwasher, fireplace, 2-car gar., \$2000 below market, \$32,500. Torrance, FR 8-1350. A

Piano, Fairbanks, upright, mahogany, \$150. Box 904. A

Boat Trailer, small, \$25. Inglewood, OS 6-2162. A

House, 3-bdrm. & family rm., G.I. loan, fenced yard, 4 yrs. old, Wilmington area, \$1000 dn., \$22,750. Rolling Hills Ets., FR 5-8778. A

Own-Your-Own Apt., 1-bdrm., upstairs, 900 sq. ft., bltins, 1 block to transportation & stores, pool, \$16,950. Inglewood. OR 4-7743. A

Refrigerator, \$125. Inglewood, 676-8893. A

Refrigerator, Crosley Shelvador, apt. size, small w/large freezer cap., white, \$35. Hawthorne, 675-6637. A

Home, 3-bdrm., fam. rm., 2 baths, liv. rm., din. rm., all elec. kitchen, bltin refrig., FA heat, covered patio, fenced backyard, in W. Anaheim, assume 4 1/2% GI loan or refin avail., \$22,650. Orange, 633-4378. A

Home, 3-bdrm., near main plant, excel. cond., \$18,950. L.A., 754-9576. A

Hi-Fi Equipment, Garrard 98 changer, Harman-Kardon amplifier, R-J enclosure, Jim Lancing extended range speaker, \$45. Box 905. A

Cabin Site, tree-covered, at Lake Arrowhead, roads, water, electricity, ready for building, terms avail., \$1450. L.A., 472-3374 A

Stove, O'Keefe & Merritt, 10 yrs. old, deluxe model, \$40. L.A., 757-4252. A

Ford, 1956 sta. wagon, near new brakes & exhaust system, \$100. Westminster, 714-892-3807. A

Wonder Horse, largest size, \$12. Rolling Hills Ets., FR 5-9689. A

Battery Pack, for Sears 9" or 11" transistorized TV, \$15. L.A., 670-2564. A

House, 2-bdrm., fireplace, dble. garage, \$20,950. Inglewood, OR 1-3860. A

Boat, 14' Catamaran, 1965 Mercury 100 hp motor, rideguide trailer, complete, \$1550. Hawthorne, 327-5229, 679-4837. A

Volkswagen, 1966, low mileage, many extras, \$2400. L.A., 276-4543. A

Pickup, 1949, 3/4-ton Ford, \$150. Hawthorne, OS 9-3476. A

Racing Bicycle, 15-spd. Rapheal Geminiani Deraillieur, many chrome extras, \$70. P.V. Ets., 375-4742. A

House, 2-bdrm., on 1/2 acre, off Ventura Fwy. in rural area of Oxnard, take residential or rural lot for equity, or \$16,000. 372-8502. A

Avion Travel Trailer, 30' Imperial, awning, reese hitch, air cond., \$3400. Santa Ana, 714-839-5663. A

VW Bumpers, complete w/guard, \$16. Hunt-ington Bch., 714-897-8201. A

House, 3-bdrm., 1 1/4 bath, \$26,500. Gardena, FA 1-1186. A

Cabin, 2-bdrm., unfinished inside, on 50' x 100' lot at Big Bear Lake, water, elect. & septic tank in, \$10,950. Fullerton, 525-1677. A

Mustang, 1965, p/s, auto. trans., console, \$1650. Playa del Rey, 398-1458. A

Wanted to Buy

Tools & accessories, small pneumatic drills, chippers, impact wrenches. Whittier, OX 3-4117. B

Chevrolet Greenbrier Van w/plenty of window space, late model. Hawthorne, OS 6-8331. A

Pool Table for home use. Manhattan Bch., FR 2-6916. B

Cement Mixer, either elec. or gas powered, reasonably priced. Pico Rivera, 695-1445. B

House Trailer, old, capable or being towed to the mountains, sleep 4 & some heating facilities. Torrance, DA 6-5558. B

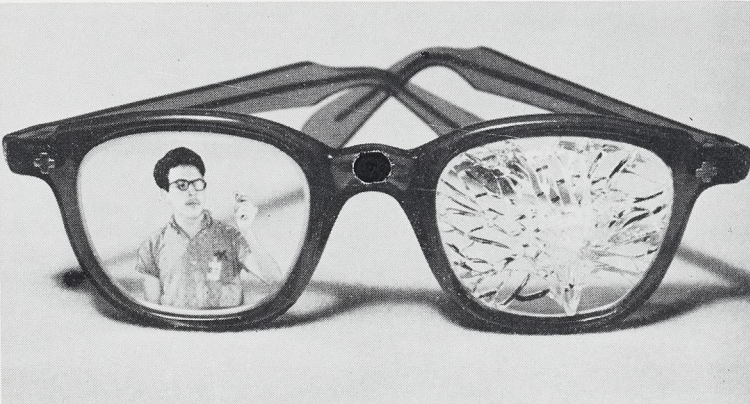
VW-Karmann Ghia, 1957-1962, reasonably priced. Rosemead, AT 8-0207. B

Trailer, luggage, bumper-type w/2 swivel wheels. Hawthorne, 676-5253. B

For Trade

Television, trade for good organ & will pay some. Hawthorne, 675-6020. C

A NUTSHELL STORY



Armando Martinez, with an assist from Norair Photolab, tells a graphic story—small washer forcibly ejected, struck safety glasses, lens shattered, but Mr. Martinez uninjured. Besides knowledge he has prevented possible eye injury, Mr. Martinez is also a candidate for Wise Owl Club of America.

FREE (To Be Given Away)

Doghouse, for small dog, all wood, can be remodeled, assembles in 3 secs. Torrance, 370-4025. D

Need reliable homes for puppies, part bassett. Inglewood, OS 6-6412. C

Rentals Offered

Cabin, Green Valley Lake, reserve now for summer vac., \$35 weekends, \$60 wk. Torrance, 320-2002. E

Apt, 1-bdrm., deluxe, bltins, pool, \$95 mo. Redondo Beach, 376-2117. E

Apt, 3-bdrm., 2 1/2-bath, bltins, pool, new condominium, \$295 mo. Rolling Hills Ets., DA 5-5609. E

Home, 4-bdrm., 2-baths, family rm., encl. atrium, lge. yard, \$350 mo. P.V. Ets., 377-3858. E

Vacation Cabins, Idylwild, secluded, stream, patios, \$20 to \$30 weekend, \$60 to \$70 wk. L.A., PL 4-5288. E

Apt, 2-bdrm., unfurn., disposal, carport, laundry rm., 9 miles from Northrop, 1 child OK, \$90 mo. Lynwood, 635-3784. E

Need bachelor roommate to share lge. apt., furn., 2-bdrm. w/pool, 4 blocks from Northrop, \$70 mo. Gardena, 321-0928. E

Cabin, Lake Arrowhead, near lake & village, fireplace, bar, patio, \$55 wk., \$25 weekend. N. Hollywood, 761-9645. E

Sleeping Room, bachelor's, pvt. entrance & bath, utilities furn., close to all shopping & Northrop, \$45 mo. Hawthorne, 676-7328. E

Apt, 1-bdrm., ext. lge., bltins, gar., water & trash pd., close to Northrop, \$90. Hawthorne, 325-5705. E

Apt, 2-bdrm., near So. Bay Shopping Center, bltins, children OK, \$110. Redondo Beach, 374-5879. E

House, 2-bdrm., to share w/another man, 10 mins. from Northrop, \$70. Torrance, DA 3-8333. E

Apt, furn., 1-bdrm., gar., \$110 mo. Manhattan Bch., FR 4-0750. E

Apt, 2-bdrm., 2-bath & 3-bdrm., 2-bath., unfurn., dishwashers, air cond., pvt. balconies, sound proofed, sub. parking, from \$152. Inglewood, FR 5-0867. E

Apt, 3-bdrm., 1 1/4-bath, near Del Amo Shopping Center, \$165 mo. Torrance, FR 1-1308. E

House, 4-bdrm., unfurn., 2 baths, dble. gar., bltins, fireplace, patio, \$185 mo. Westminster, 714-531-7138. E

Roommate, girl, wanted to share apt. w/ heated pool, share expenses, \$55 mo. Hawthorne, 676-8621. E

Apt, 1-bdrm., furn., 1 block from Northrop, closed gar., newly decorated, adults only, \$80. Lawndale, OS 6-5425. E

Bachelor Apts., furn., pvt. entrances, 4 short blocks to Northrop, all utilities paid, \$15, \$16, & \$20 wk., San Pedro, TE 3-2512. E

House, 1-bdrm., Inglewood area, dining rm., service porch, water & trash pd., redeco-rated, \$90. Gardena, DA 3-4116. E

Rentals Offered

Vacation Cabins, Lake Gregory & Crestline, make reservations early for May thru Sept., \$25 weekends, \$60 wk. Venice, EX 1-2040. E

Rentals Wanted

Travel Trailer for 2 weeks in August. Torrance, 371-9730. F

Personals

I would like to thank everyone, especially in Orgn. 8837 for their expressions of sympathy & kindness during our recent bereavement. ALICE COFFEY. L

For Sale or Trade

Lathe Chuck, Atlas, 3-jaw univ., 5" dia. \$30 or trade for revolver, .22 cal. auto., dble. action or rifle w/scope. Box 905. M

MGA Roadster, 1962, 1600 Mark II, r/h, \$1200, or consider sports car in trade. Port. Bend, 377-8444. M

Going my way?

Rides Wanted

7:30 a.m. — 4:15 p.m.

Hermosa Ave. & 26 St., Hermosa Beach. Penny Prouty, Norair, exts. 1126, 1127, OS 9-6520. 3

El Segundo & Doty, Hawthorne. Panya Noguera, Mariposa, ext. 4268, 644-2039. 3

Melrose & N. Vermont Ave., Los Angeles. Catch ride anywhere near Hollywood Fwy. & Vermont Ave. Will pay \$5 wk. John Kayser, Norair, exts. 1052, 2015, NO 5-2046. 3

8 a.m. — 4:45 p.m.

Figuroa & Anaheim, Wilmington. Need ride home. Tom Henrich, Norair, ext. 2425, TE 5-9070. 5

From Thousand Oaks. Seth O. Lewis, Norair, ext. 1412, 805-495-9410. 5

Alondra & Central, Compton, James R. Jones, Norair, ext. 2024, 537-1689. 5

Portofino Anchorage, Redondo Beach. H. G. Young, Johnson Bldg., ext. 563, FR 6-9494. 5

Orange Ave. & Del Amo Blvd., Long Beach. W. H. Covert, NSL, ext. 2721, GA 3-1363. 5

Jefferson & La Brea, Los Angeles. Sheldon Ossoff, Norair, ext. 1016, 837-2916. 5

Rides Offered

7 a.m. — 3:45 p.m.

So. San Diego Fwy. & Westminster Ave., Huntington Beach. Mort Schulman, Norair, ext. 2597, 714-892-5018. 12

8 a.m. — 4:45 p.m.

From Thousand Oaks. Seth O. Lewis, Norair, ext. 1412, 805-495-9410. 15

Orange Ave. & Del Amo Blvd., Long Beach. W. H. Covert, NSL, ext. 2721, GA 3-1363. 15

Jefferson & La Brea, Los Angeles. Sheldon Ossoff, Norair, ext. 1016, 837-2916. 15

BOEING LINE: A 20-Year Association

(Continued from page 2)

air in the morning and the required parts were en route to the scene by late the same day. Many similar incidents have been recorded in which Norair reacted quickly to provide components without interfering with regular production rates.

A highly skilled, although relatively small, group of veteran Northrop employees man subcontract production facilities, working for Superintendent W. J. Minner's Subcontract Operations.

They are, in Mr. Minner's words, "Northrop's finest."

General Foremen J. L. Holman (outer wing) and Leo Sacks (aft fuselage) are directly responsible for an assembly line force of 165 employees.

"Many organizations and functions also play important parts in the over-all program," Mr. Minner adds.

Noteworthy and continuing contributions are attributed to men like Guy Kirby and his Quality Control personnel, Arthur Marta and others from Tool Engineering, Joe Purvis of Planning, Lee Robinson and Wendall Howard of Contract Administration and many others.

Boeing maintains a resident office at Norair staffed by Fred Walker and Jim Thomas, Quality Control specialists. Bruce Frost of Boeing's Los Angeles regional office helps coordinate over-all activities.

At Renton, Washington, Norair's Ed Sellinger operates a resident office within the Boeing plant.

With the exception of some cast forgings, Norair fabricates outer wings and aft fuselage assemblies from raw materials. Completed assemblies are ready for mating upon arrival at Boeing.

Normal shipments find two complete ship sets of components riding aboard two railway cars.

PLASTICS GROUP VISITS NORAIR FOR AIRCRAFT BRIEFING

Twenty-seven plastics workers and their supervisors from Northrop Ventura visited Northrop Norair May 6 in an "effort to better understand the aircraft for which they make components."

It was announced last month that Ventura Division would be increasing the number of fiberglass components produced for the F-5 tactical fighter and T-38 supersonic trainer.

"Our people asked for this trip and volunteered to go on their own time and at their own expense," Plastic Shop Supervisor Harry McLaughlin said.

Arrangements were completed by Jack Lind, of Ventura Materiel Control, and J. J. Callahan, chief of Manufacturing Control on Norair's second shift. Mr. Callahan was host for the group.

The visitors toured the F-5/T-38 assembly line, inspected the Norair metal bonding shop and viewed a film on Operation Skoshi Tiger.

VOYAGER

(Continued from page 1)

between 100,000 and 150,000 feet in the earth atmosphere, simulating various Mach numbers as well as velocities to produce the data required to substantiate deployment and inflation characteristics, stability, and equilibrium performance predictions."

Both balloons and rockets will be used to carry the experimental payloads from White Sands, New Mexico, to their test altitudes, NASA acknowledged last week. NASA responsibility for the Voyager landing system is vested in the agency's Langley Research Center.

Northrop Ventura studies have taken into consideration the estimates of the extremely rare Martian atmosphere based on data provided by Mariner 4 in its flyby of the Red Planet.

A Mars landing could be achieved with any one of three Northrop Ventura parachutes, he said.

The Voyager (Mars) program is expected to be the next major NASA program and, with 10 years experience in developing parachute landing systems, as well as three years of effort directly related to Mars missions, the Division feels it is in an excellent position to make a significant contribution to this phase of the country's planetary exploration programs.

F-5 STRIKES AT VIET CONG



Flying a Northrop-built F-5 tactical fighter, a U.S. Air Force pilot drops general purpose bombs on a Viet Cong position in Vietnam in this photo released by Seventh Air

Force Headquarters at Saigon. F-5's have since been assigned permanently to Vietnam as part of 10th Fighter Commando Squadron.

EARNINGS

(Continued from page 1)

The company's backlog at the end of the third quarter totaled \$435,000,000, as compared with \$314,000,000 at the same time a year ago.

"With the results to date and the business already in hand," Mr. Jones said, "it seems clear that the current fiscal year should exceed last year in both earnings and sales. Our ratio of net earnings to sales has been improving steadily, and this favorable trend is expected to continue," he said.

"We expect new contracts received during this fiscal year to exceed \$500,000,000 by the end of the year," Mr. Jones said, "and this does not include any of our participation in the new Boeing 747 transport program."

"While the outlook for our military aircraft business, both the F-5 and the T-38, continues bright into the future, the recent growth in new contracts is in fields other than aircraft, Mr. Jones said. New contracts for communications systems this year should total about \$95,000,000, as compared with about \$17,000,000 the previous year. In surveillance, reconnaissance and intelligence processing systems, new contracts received should go from about \$4,000,000 last year to about \$10,000,000 this year.

FLO JOHNSON: Looking Ahead To New Developments in Textiles

(Continued from page 1)

ucts like silk and cotton.

"Using these synthetics we can build almost any requirement into a parachute a paradyamicist could want.

"Heat is the problem today and we're working on strong new fabrics that will resist heat better. That will be the next big breakthrough in parachutes, especially for application to space.

"I want to know about the potential new fabrics before this breakthrough happens."

Her early training included the same course at what is now Norton Air Force Base. She was trained there as a parachute rigger at the beginning of World War II. Classes included major

parachute repairs and sewing machine overhaul.

After eight years as a plant manager, following the War, she decided to go into business for herself.

Less than a year later Mrs. Johnson joined Northrop Ventura, again becoming head of a shop. Her first task was working with paradyamicist Ed Ewing on the Skysail program to develop a personnel parachute for the Navy.

Her work continued on Mercury and Gemini, and the emphasis switched to production planning just as Apollo research and development was beginning.

"One important thing common to fabrication R&D in all of these programs," she pointed out, "is analysis of the stitch patterns for the canopies.

"We found we could get as much as 50 pounds more resistance to damage from shock and stress by trying a variety of patterns for each particular application to find the best one."

Mrs. Johnson still holds the master parachute rigging license she obtained in 1949.

As is the case with many master riggers, she has jumped twice, both times free fall at Palmdale.

BOEING

(Continued from page 1)

effort, dispatching a team of specialists to work at Boeing headquarters, and beginning work involved in modernizing production facilities.

Northrop Ventura's long-term participation in the 747 program is expected to amount to \$40 million in the design and production of fiberglass wing and cabin fairings.

Cape Readies For Launch Of Gemini 9

Pre-launch preparations at Kennedy Space Center for Gemini IX, scheduled for "no earlier than May 17," are proceeding on schedule, NASA said this week.

Gemini 9 and its companion, Agena target vehicle, will be launched on a three-day flight to explore new rendezvous techniques and conduct extra-vehicular activity.

Thomas P. Stafford, who was pilot on the Gemini 6 mission which accomplished the first space rendezvous last December, is command pilot of Gemini 9. Eugene A. Cernan is pilot.

NASA plans call for Gemini 9 to dock with the Agena rocket over Hawaii approximately 30 minutes after rendezvous. Pilot Cernan will begin his space walk near the end of the 13th orbit and continue for one and a half orbits.

Landing of the spacecraft is scheduled in the West Atlantic recovery zone at the beginning of the 45th orbit with, of course, the Northrop Ventura parachute landing system providing the brakes.

In addition to the docking maneuver, the mission will include maneuvers of the mated vehicles using the Agena propulsion systems, separation and re-docking.

The Agena rocket will be maneuvered into a parking orbit for use as a target on a later Gemini mission.

Scientific experiments include zodiacal light photography, meteorite collection experiments (both on Gemini and Agena), and airglow horizon photography.

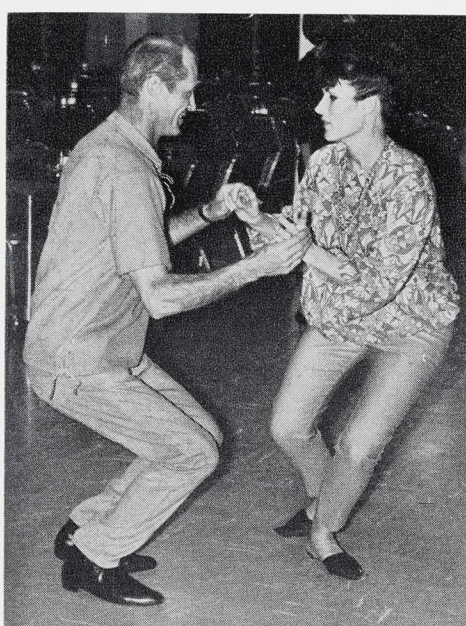
VIGICON

(Continued from page 1)

Nortronics, both ETR systems can trace, in various colors, four different satellite or missile flight patterns simultaneously. Tracking station signals are fed directly into the plotting projectors for immediate display, while a reference projector provides appropriate screen background information such as an outline of the range or a global map.

Projection equipment is located in back of the screens, outside personnel work areas.

CHA, CHA, CHA, CHA, CHA, CHA . . .



They all look different, but three photos above depict variety of cha cha steps as Northrop Ventura Recreation Club's dance group learns the Latin American terpsichorean art. Jud Weller and wife Marjorie practice what they have absorbed, in left photo. In center, Monty Cable and wife Sherry,

dance commissioner, show more basic version of cha cha to syncopated rhythm of Latin band. In photo at right, Instructress Grable Matthews and Art Smith demonstrate benefit of dance tutoring that anyone with some sense of rhythm can take advantage of.

Photos by Dan Cashier

NORTHROP NEWS

NORTHROP VENTURA

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Vol. 24, No. 10

May 25, 1966

'No Squawks' Record for Vietnam F-5

Two Air Force ground crewmen assigned to a Northrop-built F-5 fighter in action in Vietnam have claimed for their aircraft what might be a new record for the number of consecutive combat missions flown by an aircraft without an operational discrepancy.

That record: 34 consecutive combat sorties.

Which means that during this period the pilot has not been forced to write a report which might cause the aircraft to be grounded for such reasons as a malfunctioning part or component, damage, or an inoperative system.

Involved is an F-5 maintained by S/Sgt. Dennis A. Christensen, crew chief, and A1C John G. Hooker, assistant crew chief, both of the 10th Fighter Commando Squadron.

Donald Kindy, Northrop Norair technical representative assigned to the 10th FCS, verifies the figures, adding that the aircraft now has flown 282 combat sorties against the Viet Cong.

(Figures covered the latest report issued in mid-May.)

The Northrop F-5 arrived in Vietnam in October 1965 as part of the "Skoshi Tiger" evaluation contingent of aircraft. It was the first of the F-5's in this group to log 100 combat missions. Following completion of the evaluation program, all F-5's were turned over to the 10th Fighter Commando Squadron for permanent duty in the combat zone.

According to an Air Force story, published in Vietnam, A1C Hooker has worked with the aircraft since its arrival in Vietnam. Sergeant Christensen took over as crew chief in December. Both men report paying little attention to the no pilot's discrepancy factor until after 20 missions were logged.



APOLLO LANDMARK—North American Aviation's Space and Information Systems Division and Northrop Ventura management convened recently to formalize Apollo Block II Earth Landing System agreement. Clockwise around table from left are George F. Douglas, corporate vice president

and Division general manager; J. V. Wallace of North American; Carl E. Weinert, of Northrop Ventura; Don Necker, Sandy Falbaum, John Mihelich, and Blaine Keith, all of North American; and Wes Steyer, Northrop ELS program manager.

TARGET DATE SET FOR ACQUISITION OF HALLICRAFTERS

Northrop Corporation and The Hallicrafters Company of Chicago have reached substantial agreement for Northrop to acquire all of the assets and assume the liabilities of Hallicrafters, the two companies have announced in a joint statement.

The agreement is subject to approval by both boards of directors of the two companies and other necessary clearances, including tax rulings and approvals of regulatory agencies. The target date for completion of arrangements has been set for October 1966.

It is contemplated that Northrop would issue cumulative convertible preferred stock in exchange for Hallicrafters shares. (See HALLICRAFTERS, page 6)

Apollo System for Block II Brings New Challenges

Northrop Ventura is engaged in a new challenge to advance paradynamics technology as well as the Division's capability in this field as Block II of the Apollo program commences its fifth month of activity this week.

According to Chief Project Engineer Russ Lenhart, the Block II command module has been significantly modified from Block I, making a considerable impact upon Earth Landing System requirements.

Previous command modules were designed primarily for bal-

listic and earth orbital flights, while the next phase of the program to put a team of astronauts on the moon requires a capability for lunar orbit and docking with a lunar landing vehicle.

The command module is designed and built by North American Aviation's Space and Information Systems Division, which awarded the multimillion dollar ELS contract to Northrop last January.

One of the more significant changes in the command module is the airlock which permits astronauts to enter and leave the ship while in space. The airlock has taken on an inverse taper with the top being larger than the bottom.

As a result of this and other lunar docking requirement modifications, the ELS compartment has been shortened, requiring a complete redesign of the main parachute deployment bag.

According to Carey Buhler, project engineer (Systems), the main parachutes are already so tightly packed into their deployment bags that their density equals that of maple wood.

"The new deployment bag configuration will require advancements in deployment bag design technology packing techniques, and packing efficiencies beyond that achieved on Block I," he said.

Block I techniques were already advanced beyond the usual parachute packing technology.

To meet the challenge of this major problem and the requirement for its solution within a relatively short and critical schedule span, a design and development team has been established under the direction of Bob Boulanger, project engineer (Design).

This team is investigating the (See APOLLO, page 6)

NDP to Put New System In Operation

One of the most advanced, high-performance computer complexes in the world will become operational next month with installation of an IBM 360/65 system at Northrop Data Processing Operations headquarters in Hawthorne.

The third-generation computer, the second to be installed commercially on the west coast, will replace one of two existing IBM 7090 systems. The other 7090 will be retained indefinitely.

According to S. S. Lotz, director of NDP's Operations section, the model 65 of the 360 series can do more work efficiently and faster in less space and at less cost than the 7090 system.

"New computer design, especially microminiaturization of components, gives us a compactness and versatility never before obtainable," Mr. Lotz said.

"Also, the modular design of the 360 system affords us the capability of increasing our capacity and flexibility at any time by adding other related units."

Presently being installed in the Northrop Norair Engineering and Science Center, the new computer will equally serve Nortronics and Ventura Divisions through a leased Western Union Broadband Exchange Service linking Hawthorne with Newbury Park and Anaheim.

Signals from magnetic computer tapes, which are prepared by smaller computers (Univac 1004) at both Anaheim and Newbury Park, are transmitted instantaneously to another Univac at Hawthorne which, in turn, duplicates the tape.

After the data processing results are obtained at Hawthorne on the 360/65, they will be sent back to their points of origin by the same method. At present this service is being provided using the 7090.

"This technique obviates the (See COMPUTER, page 6)

New Suggestion Drive Offers Appliances

Practically a kitchen full of electrical appliances have been added to the list of awards for cost reduction ideas during a special two-week Northrop Ventura "Puzzle Bee" June 6-20.

All you have to do is submit a money-saving suggestion and solve five simple puzzles to become eligible for the bonus prizes. These include such items as a toaster, electric carving knife and ice crusher, to name three of about a dozen to be given away.

A drawing will be held in late June to determine prize winners.

Of course, the usual cash awards, certificates and free lunches will still be there for cost conscious thinkers, the Employee Suggestion Award Committee pointed out.

AND JOLLY GREEN GIANT

Marksman Discover 'Twilight Zone'

Two former skeptics, Wade Tilley and John Morrison, now believe in the "Twilight Zone" as the result of recent events at Camp Pendleton where the two men engaged in an annual California Rifle and Pistol Association (CRPA) match.

Through a mixup in billeting arrangements on the Marine base near San Diego, the two Northrop Ventura employees came closer than they would like to remember to being shipped to Vietnam. Both men are members of the Apollo program staff.

Mr. Tilley, a World War II ex-infantryman, tells the story this way:

"We arrived at Pendleton about midnight, very tired and sleepy. We looked around for the barracks assigned to CRPA for about an hour before we

nearly ran out of gas and had to go off base to a service station.

"We returned and found the building, were issued blankets and directed to another building where we were to sleep during the three-day competition.

"By now it was 3 a.m. and we were well into the 'Twilight Zone.' We weren't anymore in bed when a loudspeaker started calling names. We began to suspect something was wrong, and a closer look around indicated the room was full of men, and overseas bags were at the foot of each bunk.

"But we drifted off to sleep again. About 4 a.m., my bunk started shaking like an earthquake had hit. I pulled the covers off my head and there was the jolly green giant wear-

ing a white helmet.

"He ordered me up. All I could think of to say was, 'but I'm a civilian.' Anyone who has ever been in the service can imagine the reaction of a sergeant who's just been told that a sleepy GI is a civilian."

It took a lot of discussion, well punctuated with exclamations, but the sergeant was finally convinced. The men later discovered that other CRPA shooters were in the same building but a different area. They went on to compete in two days of individual marksmanship and a team event on the third day which included four other members of the Northrop Ventura Rifle and Pistol Club.

"If it wasn't for the fact that I very much wanted to shoot in the match, I might have gone along with the tide of events."



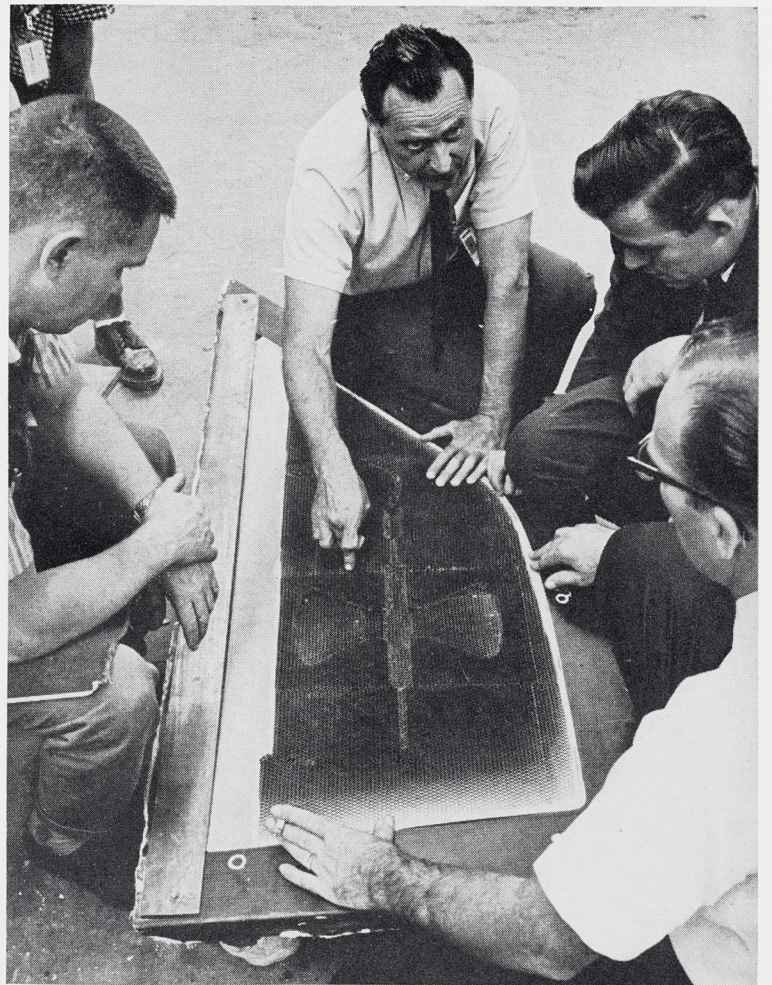
Mr. Lenhart

Fortnight in Review



F-5 IN TURKEY

Turkish citizens swarm over, under and around Northrop-built F-5 (above) at Ankara recently during official delivery ceremonies and public display of Turkey's first squadron of the supersonic tactical fighters. Dignitaries (right), both Turkish and American, review display of NATO nation's air power. After ceremonies (below), serious business of Free World defense is reflected as Turkish soldiers guard squadron. Turkey is seventh allied nation to receive the F-5. Previous deliveries have been made to Republic of Korea, Iran, Greece, Republic of China, Republic of Philippines and Norway.

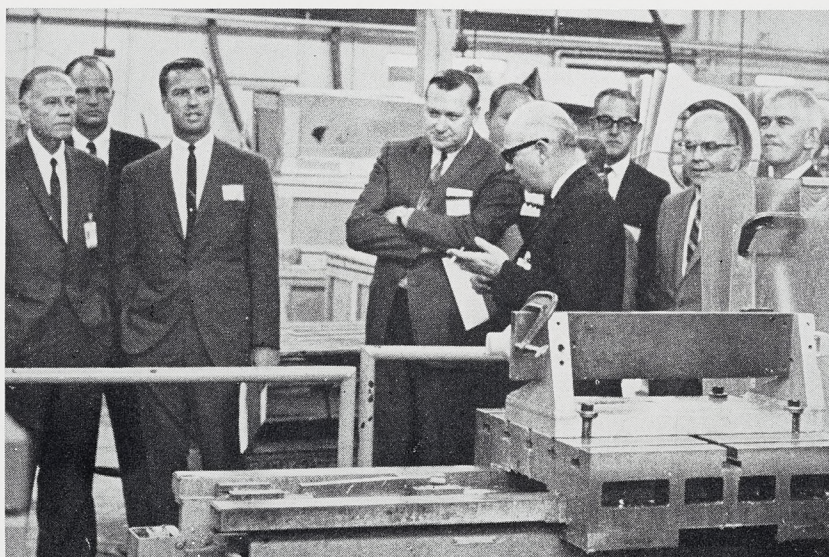


Discussing radome produced for Ling Temco Vought by Northrop Ventura are (from left) Les Spencer, Bill Lang, Ken Drake, and Tom Johnson. Radomes for both missiles and aircraft are a major product area of the Ventura Plastics Shop, which manufactures other fiberglass aircraft components. Shop will develop and produce fairings for wing and cabin of Boeing 747 jetliner.



General Wallace M. Greene Jr., commandant of the U.S. Marine Corps, awards Distinguished Flying Cross to Captain Dietrich F. Koletty, at Cherry Point, North Carolina. Captain Koletty, son of Colonel and Mrs. J. W. Koletty, received decoration for distinguished service as a helicopter pilot in Vietnam from June through September 1965. Colonel Koletty (USA, ret.) is a member of the Marketing department staff at Nortronics Palos Verdes.

CHAMBER OF COMMERCE VISITS NORTHROP NORAIR AND NORTRONICS HAWTHORNE FACILITIES



The welcome mat was rolled out early this month for top business, industrial and civic leaders taking part in the annual Hawthorne Chamber of Commerce Day at Northrop. Ray Millman, Chamber president, emerges from Apollo pallet capsule (left photo) as Gilbert Laven, Vernon Herbst and Bob Hartman wait their turn. D. G. McNeal (center photo) gestures as he explains Automated Operations

Control activities to interested group on tour. And Ann McCormack, receptionist, and Roland Scott, Community Relations coordinator, help pin badge on Mr. Hartman, Hawthorne Chamber's general manager (right photo). Visitors toured extensive area of plant, heard top Northrop officials discuss current and future business prospects.

'Fighting Blood' Sought for June Bloodmobile Visit

Northrop Corporation employees will roll up their sleeves June 16 to offer "fighting blood" to help replenish depleted stockpiles of blood derivatives facing the nation's armed forces in Vietnam.

The occasion will be a bloodmobile visit to the Northrop Norair Product Display building. The hours: 7:30 a.m. to 12:30 p.m.

Defense Secretary Robert McNamara has asked for a nationwide program to supply 250,000 pints of blood to handle increased requirements in Vietnam. Los Angeles and Orange Counties are attempting to raise 17,500 pints for this purpose.

Northrop personnel, by giving blood June 16, will be helping to meet this critical need and at the same time building reserves against heavy local uses. Northrop will receive credit for its contributions from the American Red Cross and the blood given will continue to be available to employees and their families without charge through the Northrop blood program.

But due to the pressing need, this particular bloodmobile visit is more important than any in recent years and warrants the serious consideration of each employee.

Special posters outlining the program have been distributed through Northrop's Hawthorne area facilities. Employees are asked to sign them as their indication of wishing to support this effort. Those who sign will be sent regular appointment cards for the bloodmobile.



Sandy Anglin, 15, and Gary Arnett, 18, reigned as king and queen of the 11th annual Grand Medal Ball last week in Long Beach. School-age members of 40 dance clubs selected the pair for the honor. Miss Anglin is the daughter of Norair's Jess Anglin, an engineering administrative planner.

Rodney Smith Earns Life Saving Plaudits

Rodney Smith, 14, son of Northrop Norair's Helen and Harper Smith, has received a special letter of commendation from the Surf Life Saving Association of America.

Young Mr. Smith went to the assistance of Lifeguard Paul McIlroy who was carrying out a rescue off Hermosa Beach. The rescued boy was towed to safety aboard Rodney's surfmat.

Mr. McIlroy, a member of the 1964 U.S. Olympic water polo team, lauded Rodney for his quick thinking and help noting: "Without your assistance and good timing, I feel the rescue may not have had the happy ending it did."

BY PAGE COMMUNICATIONS

S. American Satellite Link Studied

The Inter-American Development Bank has selected Page Communications Engineers of Washington, D.C. to conduct a feasibility study related to the use of satellite communications in South America.

Felipe Herrera, president of the Bank, met with Joseph A. Waldschmitt, Page president, and Walter E. Sutter, Page vice president and senior marketing director, for the formal signing of the seven-month \$250,000 contract.

A recognized world leader in communications system design, management and operations, Page will explore the advantages of satellite communications over conventional methods for the entire South American continent where communications between countries are often unreliable and inadequate.

A global satellite communications network, scheduled to begin in 1968, will permit any country having an earth station, or any country connected by microwave link to the earth station of a neighboring country, to communicate directly with every other country that has an earth station or is connected to one.

The Page study will serve to determine the most economic locations for earth stations in South America which would be linked to the satellite communications system, and the means of connection with local telecommunications systems. In a latter phase, a similar study will be conducted for Mexico and Central America.

The global satellite system

will be capable of providing telephone, telex, facsimile, and data traffic as well as television with program exchange and educational potential at a cost determined to be considerably less than that of existing methods.

In each of the 10 South American countries, the Page survey team will study the telecommunications network now in use or in the planning stage, the quality of existing service, future channel requirements, and fiscal arrangements for the over-all expansion plan. The governing agency for telecommunications in each country will be examined concurrent with attention to international facilities.

Among other areas to be considered are current and projected population figures in a given area; current and projected financial trade requirements; number of telephones; number of data processing centers and number of television sets.

The over-all study will be carried out with the cooperation of COMSAT, the company formed in 1963 to promote commercial communications by means of satellites. The international use of satellites for communications is regulated by an agreement which has been signed by 48 nations including Argentina, Brazil, Chile, Colombia and Venezuela.

FRIDAY IS NORTHROP'S NIGHT TO TAKE OVER MAGIC KINGDOM

Friday is the day—Northrop Night at Disneyland—when all the features and fun facilities of one of America's greatest attractions will be available exclusively for Northrop families.

And all for a nominal \$3.95 per person.

Tickets, available at all Northrop facilities, entitle the holder to admission to the park, plus unlimited use of all rides, attractions, features, exclusive of shooting galleries, from 8 p.m. until 2 a.m.

Included is admission to the famed Tiki Room, plus the opportunity to hear such name bands as Harry James, Xavier Cugat and a host of other entertainment personalities.

The general public will be cleared from the area prior to 8 p.m.



Maestro Harry James will play for Northrop families taking part in special NRC Night at Disneyland Friday. Xavier Cugat is another entertainment headliner who will appear.

MOTHER AND ENGINEER, TOO

Chasing Dogs In The Wilderness Is 'Musher's' Forte

You can add seven thoroughbred Samoyed sled dogs to the contingent of Northrop engineers and their families who are moving to Renton, Washington, for the preliminary design phase of the Boeing 747 program.

The dogs belong to Mrs. Lloyd Bristol, Northrop Ventura structures engineer, mother of two children, professional dog trainer, and holder of the 1966 "Musher of the Year" title conferred upon her by competing racers in the 12th annual Big Bear Sled Dog Derby last February.

She is one of about 10 Northrop Ventura engineers who are joining about 40 structures experts from Northrop Norair at Boeing's Seattle facility where the huge 490-passenger jetliner is being designed.

Norair will build the 150-foot passenger section and Ventura will produce the fiberglass fairings for the wing and cabin as Northrop's participation in the design and manufacture of the world's largest commercial jet airliner.

Mrs. Bristol pioneered sled dog racing on the West Coast (excepting Alaska, of course), and the annual Big Bear derby, while not the only regular competition, is now the largest in the West with 23 teams competing this year in the major, long distance event.

"It was 17 years ago," she recalls, "when my husband, myself and two Samoyed pups were suddenly snowed in while vacationing at our cabin at Big Bear. We built a sled and harnesses and used the dogs to haul supplies until the roads were re-opened.

"It was so much fun, we began

breeding, raising and training Samoyeds for sled work. The idea caught on quickly and has continued to grow and spread throughout the west."

In 1955 the Bristols were asked to display the sled team in action at Big Bear, and they put together a race involving five teams. That led to organization of a club and in the following years the competition extended to Serbian Huskies, Alaskan Malamutes, German Shepherds, and even Irish Setters.

But the Samoyeds, which spread from the Ural Mountains in Russia and from which the famed Alaskan Huskies are descended, are still the best sled dogs, Mrs. Bristol feels.

The dogs have a wool coat rather than fur, and its similarity to Angora has made it a valued material for making sweaters, dresses and men's suits, she said.



Lloyd Bristol, Northrop Ventura structures engineer, steers team of pure-bred Samoyed sled dogs through snow at Big Bear, which has become west coast center of sled dog racing.

Since Southern California is not the most suitable place in the world for sledding, the Bristols and their friends have improvised by putting wheels on their sleds and racing in the desert.

"This helps to keep the dogs in shape," she explained. "They adapt marvelously to the weather extremes, and they have worked on occasion in temperatures of 70 degrees above and 12 below zero in the same week."

The drivers have to keep in shape, too, she reminded.

"Since snow in California is only found in the mountains, the race courses are usually half straight up and the other half straight down."

Average speed of a dog team is 10 miles an hour and the average race is in 15-mile sprints.

In addition to five annual races in the Los Angeles area, sledders now com-

pete at Palm Springs, Lake Tahoe and Nevada City. But the events have all been organized by people who got their start with the Bristols in Los Angeles and have since moved to those locations.

Mrs. Bristol recently learned that a competition is getting started in Oregon as well.

Community Chambers of Commerce have done a great deal to enhance the popularity of dog sled races, Mrs. Bristol pointed out, through promoting events as a means of attracting tourists during the off season.

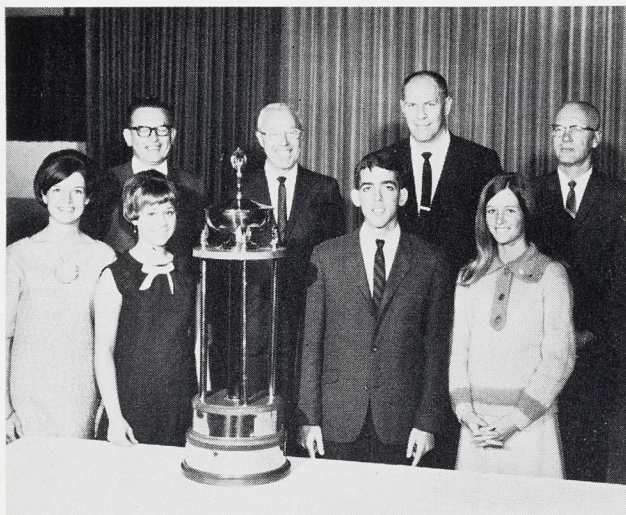
Training a team is not too difficult if you have a good lead dog, she says, but without that lead dog you are sunk.

"The Samoyeds are intelligent, amenable and they like their job. An individual pup can get oriented and learn to stay in line in about a day, but it takes many weeks of work to get a team working together.

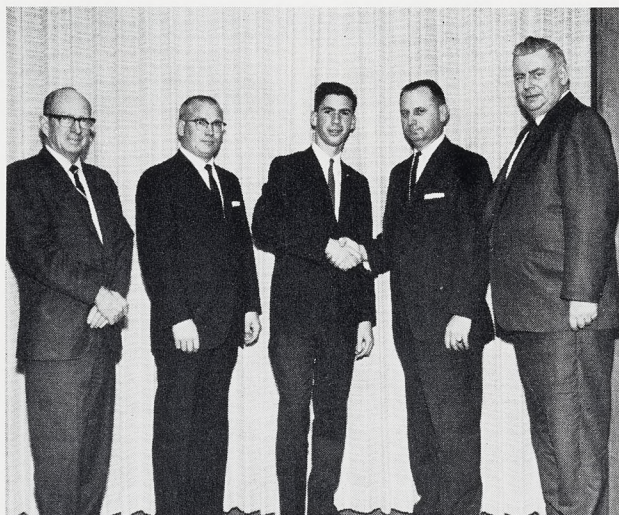
"Commands which are similar to those used with horses are easy for the dogs to learn. We don't use the word 'mush' at all. More often we'll say 'go' or perhaps just whistle.

"The lead dog, however, has to possess a native intelligence which cannot be taught. For example, when he comes to a tree he has to know to swing wide enough around it that the sled doesn't smash into it."

Mrs. Bristol's nine-year-old daughter Lyn has been riding a sled since she was two, but because of club rules couldn't compete until she was eight. This year at Big Bear, Lyn finished sixth in a field of more than 40 entries in the children's race.



SWEEPSTAKES AWARDS—Officers and counselors of Trivco, Junior Achievement firm sponsored by Nortronics Anaheim pose with huge trophy (left) presented to Company-of-the-Year at Future Unlimited Banquet earlier this month. In center photo, Kenneth Stern is told he has been named Best Manufacturing Vice President in Southern California by judges. Norair Management Club spon-



sored award and past president Rollie Pontious made official presentation at banquet. Judges were Ed Laski, Harvey Cook and Tom Brazil of Norair and Gilbert Gayler of Western Airlines. In photo at right, Doug Finch receives five year J-A pin from H. E. Riggins, Northrop Ventura vice president-Administration. Mr. Finch was counselor this year to Conaco firm counseled by Ventura Division.



TIME FOR AN ACCOUNTING

Annual Banquet Climaxes 1966 J-A Year

Another Junior Achievement year came to its official close May 12 with the annual Future Unlimited Banquet at the Hollywood Palladium, but most of the youthful company executives and their industry counselors are still busy finalizing their annual reports and disbursing funds to shareholders. J-A firms counseled by Northrop west coast divisions were well represented at the banquet and all were recognized, either for individual or group efforts, before the evening was concluded.

The 12th annual Future Unlimited Banquet was a salute by business and industry to the 3500 teenage executives who organized and operated 172 Southland companies in the 1965-66 year and to the 500 business men and women who voluntarily gave their time to serve as advisors.

The biggest salute of all went to a firm counseled by Nortronics Anaheim — Trivco — the Southland's Company-of-the-Year for 1966. Chris Thayer, vice president for Sales, accepted the huge trophy which required two Achievers to carry it off the stage.

The two basic requirements for Company-of-the-Year honors were sales in excess of \$500 and a minimum of 80 percent attendance at all meetings throughout the year, but the real reason for Trivco's success was "the way the kids worked

together toward well understood, established goals," according to A. C. Weishaar, sales advisor.

After winning the top honors for Orange County, Trivco executives were interviewed by members of the Los Angeles Junior Chamber of Commerce, sponsors of the Southland award, prior to being named Company-of-the-Year.

Final judging involved nine firms, all selected as the best company in their respective business centers.

In other banquet activities involving Northrop, Doug Finch, Northrop Ventura coun-

selor to Conaco, Inc., was recognized for completing his fifth year of service to Junior Achievement.

The Northrop Norair Management Club, which also sponsors two firms in the Southwest Business Center, again presented an award to the Manufacturing Vice President of the Year, one of five major individual awards made annually to outstanding executives.

(Other categories, each sponsored by a different company, include best president, best marketing executive, best treasurer, and best salesman.)

Kenneth M. Stern, a senior

NORTRONICS' WEAVER HONORED FOR SERVICE TO EDUCATION

The California Congress of Parents and Teachers has bestowed an Honorary Council Life Membership upon Don M. Weaver, general supervisor in Precision Manufacturing at Nortronics Hawthorne.

Mr. Weaver's award, which carries a scholarship in his name for a deserving student entering college, recognized "outstanding service to youth and education."

Mr. Weaver's services to



Mr. Weaver

education are extensive. He was a past president and member of the Lawndale School District Board of Education (four years). He is a member of both the California and National School Board Associations. He presently serves on the executive board of the Los Angeles County School Board Association. And he currently is a member of the Centinela Valley Union High School District Board of Education serving for the past year and a half.

In his spare time Mr. Weaver serves such civic functions as the Centinela Valley Fine Arts Association (as a founder and vice president), United Way (board of directors) and Explorer and Boy Scouts (merit badge counselor).

Mr. Weaver served in the U.S. Navy during World War II and Korea campaigns and is an Industrial Management degree candidate at UCLA and AA graduate of El Camino College. He has been with Nortronics since 1951 in Precision Manufacturing.

World Tour Meeting Scheduled Tonight

Would-be world travelers will gather at 7:30 p.m. tonight (May 25) at NRC Clubhouse, Hawthorne, for information and films highlighting a planned NRC-sponsored around-the-world tour which departs September 2.

The 33-day excursion will hit many points in the Orient, the Far East, the Holy Land and the Greek Islands. Cost is \$1495 per person.

UNIQUE EXHIBIT ALLOWS BLIND TO STUDY VEHICLES

Northrop Corporation has provided a 1/30th scale model of its T-38 Talon trainer for an entirely new concept in museum displays — a "Touch and See" exhibit.

"Touch and See" is for the blind who often have little concept of what sighted persons take for granted. For instance, the blind find it difficult to keep up with advancements in transportation, so the first exhibit features planes, trains, rockets, ships, cars and trucks.

The T-38 model, like the 21 other items in the exhibit, is mounted adjacent to a sign (in braille) telling about it. There is also a scale-size human figure for immediate contrast. A blind person can "read" about the trainer and at the same time "see" it through his keenly developed sense of touch.

Originated at the Newark, New Jersey, museum, the exhibit has proven to be highly successful. Plans are now being formulated to make the exhibit available at other locations.

Special arrangements are made to allow the blind to visit the museum before regular hours and to remain as long as they desire.

Dinner, Information On Hawaii Offered

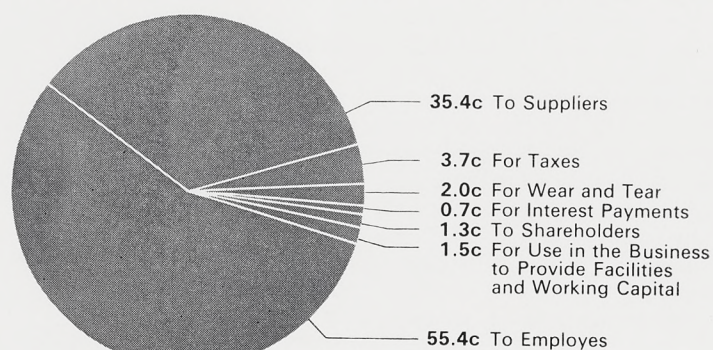
A full-course Cantonese dinner at bargain rates, plus information on the annual NRC-sponsored Christmas tour of the Hawaiian Islands will be available June 10.

That's when NRC travelers will gather at Yue's Cantonese Restaurant, 1828 W. Rosecrans, Gardena.

Surl Kim of Kim's Tours and NRC will defray \$1 of the \$2.75 dinner cost. Reservations may be made through Personnel Activities at Norair, ext. 2486.

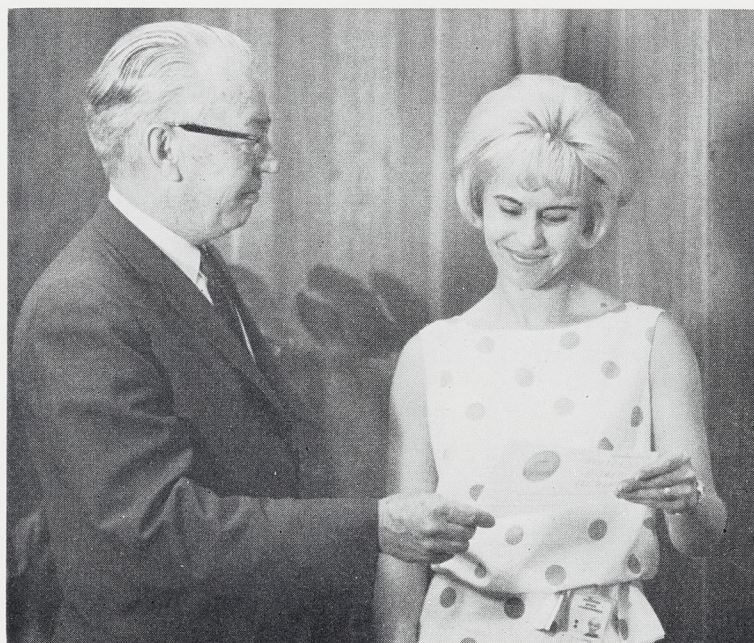
WHERE NORTHROP SALES DOLLAR GOES

Northrop received during first nine months of fiscal 1966		
	Thousands	
From sale of its products and other income (net)	\$245,600	100.00%
These receipts went		
To suppliers for materials, services, etc.	86,900	35.4%
For Federal, state and local taxes	9,000	3.7%
For wear and tear on use of equipment, etc.	5,000	2.0%
For interest payments	1,800	0.7%
To Northrop shareholders	3,100	1.3%
For use in business to provide facilities, working capital	3,800	1.5%
To employees for payrolls, employee benefit, etc.	136,000	55.4%



Using the first nine months of the 1966 fiscal year as an example, this illustration shows how Northrop's sales dollar is disbursed. Largest portion is paid to employees in salaries and benefits.

PAYOFF IN ALABAMA



First employee Suggestion Award presented at Northrop Space Laboratories—Huntsville goes to Mrs. Polly Solomon. Making presentation is J. A. Barclay, Huntsville manager.

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

For Sale

Television, 21" General Electric console, swivel base, remote control, blonde cabinet, \$50. Torrance, DA 6-5566. A

Baby Crib, deluxe Edison birch w/Kantwet mattress, \$20. Torrance, 323-8089. A

Telescope, 3" Tasco refractor, equatorial, manual slo. motions, 5 oculars, barlow, sun fil., ext. tripod. storage case, \$100. Torrance, 378-7478. A

Bicycle, Schwinn Varsity Deraileur, 2 yrs. old, cost over \$85, \$45. Gardena, 329-4387. A

Bedroom Furniture, child's, bedframe & headboard, white, \$10. Other items var. prices. Hawthorne, OS 5-7965. A

Play pen, training chair, \$10. Hawthorne, 675-6020. A

Trailer, 2-wheel box-type, inside dim. 45" x 7'10" x 27", spare wheel & tire, lights, springs, fender & cannon plug disconnect, tie down inside, \$75. Hawthorne, OS 9-8644. A

Broiler/Rotisserie, Farberware open hearth, elec., smokeless, spatterfree, \$25. San Pedro, TE 3-9430. A

Radial Arm Saw, 10", blades, stand, casters, wire brushes, chuck, \$145. Torrance, 376-4771. A

Plymouth wagon, 1959, 6-cyl., r/h, auto. trans., good tires, \$400. Gardena, DA 4-0649. A

Oldsmobile Cutlass, 1962, r/h, w/s/w, p/s, 2-dr., orig. owner, \$1125. Torrance, 325-0816. A

Golf Clubs, Spalding, set of 3 woods, Bobby Jones pinsplitters, 6 mos. old, \$40. Valinda, 330-8777. A

Rambler Wagon, 1950, new paint, brakes, clutch, \$350. Yorba Linda, 528-0884. A

Dog House, peaked roof, 36" x 43" x 44" high, finished, \$15. Garden Grove, 714-892-5450. A

Pickup, 1/2-ton, Ford, r/h, sleeper camper, cabinets, water tank, \$1175. Long Bch., 714-336-5119. A

Freezer, 22 cu. ft. chest-type, \$50. Redondo Bch., 376-2068. A

T-Bird, 1956, h/top, silver gray, fresh o/haul, paint & tires, auto. trans., orig. owner, \$1275. Pacific Palisades, 454-2057. A

Home, new, 3-bdrm. & den, 2 baths, bltin range, dishwasher, disp., thermo, heat control, \$2000 dn., Simi Valley, \$22,000. Redondo Bch., FR 8-3809. A

Pontiac, 1959 station wagon, Safari, p/s, auto. trans., air cond., \$625. Beverly Hills, CR 6-3534. A

Chevrolet, 1957, 4-dr. V-8 standard trans., glass paks, r/h, \$275. Torrance, 375-0165. A

Train, 3/16" American Flyer, 2 locos., 4-pass., 53 pcs. track, 5' x 9' plywood table top, other access., \$30. Fullerton, 714-871-4775. A

Sailboat, 14' Sunfish, lanteen rig, nylon sail, Mastercraft trailer, alum. mast, re-finished, \$375. Anaheim, 714-772-3847. A

Studebaker, 1957, h/top, Golden Hawk, r/h, p/s, auto. trans., 289 c.i.d. V-8 w/variable speed McCullough supercharger, \$395. Redondo Bch., FR 5-5838. A

Master Bedroom Set, walnut, modern, 4 pcs., \$125. Redondo Bch., 672-7424. A

Ski Boat, 18' Mahdella, fiber glassed wood hull, 265 cu. in. Chev. eng., 10 hrs., water cooled V-drive, auto. trans., lge. wheel steel trailer, \$2000. Gardena, OS 9-6222, OS 6-8296. A

House, 4-bdrm., 2-story, 2250 sq. ft., fireplace, lge. patio, landscaped, fences, sprinklers, insulated, 1 1/2 yrs. old, \$30,000. Compton, 632-4978. A

Tent, 9 x 9 umbrella, \$11. Torrance, FR 1-5072. A

House Trailer, 38' x 8', fully furnished, new \$200 awning, \$1600. Pasadena, 795-5609. A

Trailer, Terry 21', 1964, sleeps 5, butane stove & heat, elec. refrig. & water heater, bathrm. w/shower, 20-gal. pressure water tank, \$2200. Norwalk, UN 3-7548. A

Cadillac, 1964, sedan DeVille, air cond., all power, 1-owner, low mileage, \$3750. Inglewood, OR 1-7319. A

Land, Antelope Valley, Hi Vista, 10 acres, \$330 terms; \$285 acre. Los Alamitos, GE 1-7056. A

House Trailer, 18', sleeps 4, stove, refrig., cooler, shower, \$1295. Redondo Bch., FR 8-2609. A

Cadillac, 1965, 4-dr., p/windows, p/s, p/b, air cond., 10 mos. old, \$4740. Orange, KE 2-5938. A

Hodaka 90cc, 1965, access., \$350. Lomita, 325-3376. A

House, 2-bdrm., 2 blocks from Northrop, zoned for apartments, 10% dn., \$16,500. L.A., 754-4098. A

Honda 55, 1963, trail & hwy. bike, compl. w/extras, auto carrier bar, less than 1000 miles, extra tire, \$250. Torrance, FA 8-5931. A

Home, 2100 sq. ft., 4-bdrm., family rm., 3 baths, used-brick fireplace, bltins, landscaped w/sprinkler sys., on 1/4 acre lot, in E. Anaheim, \$29,900. Anaheim, PR 4-7084. A

Chevrolet Impala, 1960, V-8, low mileage, \$850. Santa Monica, 399-7648. A

Porsche, 1959, convt. D-1600, new paint & top, Michelin X tires, Blau Punkt radio, 2 speakers, tonneau cover, \$1650. Torrance, 370-2048. A

For Sale

Pontiac Le Mans, 1963, Sports Coupe V-8, auto. trans., p/s, b/seats, low mileage, new tires, \$1450. Culver City, EX 7-8681. A

Tropical Fish Aquarium, 25-gal. display-type, heater, miracle & charcoal filters, pemoc pump, rocks, 24 assorted fish & many extras, \$50. Gardena, 323-3796. A

Chrysler 8 cpe., 1931, eng. rebuilt, body needs work & some parts, \$400. Palmdale, 805-947-5555. A

Mobile Home, 35' Rollaway w/8'x15' Calif. cabana, knotty pine int., redwood storage rm., new furniture, 2 blocks from Northrop, \$2995. Hawthorne, OS 5-8207. A

Pickup, 1963 Chevrolet, 1/2-ton, V-8, column shift, r/h, fleetsides, short bed, overloads, low mileage, \$1200. Lawndale, 370-5056. A

Alfa Romeo Spyder 2600, 1964, disc brakes, 5 forward, reclining seats, tools, \$2895. Lynwood, 635-3784. A

Motor Bike, 3-wheel, factory made, 2-spcl. clutch, \$65. Redondo Bch., FR 5-0747. A

Stereo Tuner & Amp., Scott, Jensen speakers, \$225. L.A., PL 7-7911. A

Karmann Chia, 1959, good mechanically, \$950. Hawthorne, 532-4227. A

House, 3-bdrm., paneled den, lge. all-elec. kitchen, patio, block wall fencing, 4-3/4% loan or refinance, \$21,750. La Mirada, 944-1734. A

Volkswagen Bus, 1964, 1500 engine, \$1500. Anaheim, 847-4862, 535-2008. A

Pup, fox terrier & wire-haired mix, 8 wks. old, \$2.50. Lawndale, FR 0-9440. A

Refrigerator, Crosley Shelvador, white, \$50. Torrance, DA 3-8797. A

Parts for 1964-65 Chevelle, 4:56-1 rims & pinion, \$40. So. Pasadena, 799-1385. A

Ford station wagon, 1957, good condition, \$250. Torrance, 379-7165. A

Chevrolet Impala, 1958, sport coupe, special int., chrome wheels, 348 cu. in. V-8 w/Turboglide, many extras, \$875. Lynwood, 632-2642. A

House, ocean view, 3-bdrm., patio, \$21,000. Hermosa Bch., 374-8885. A

Chevrolet, 1958, convt., 348 cu. in. eng., auto. trans., p/s, p/b, positraction, radio w/rear speaker, heater, w/w, excel. top, \$500. Compton, NE 9-3825. A

Ping Pong Table, 1-pc. top regulation size, incls. 4 paddles, \$20. Hawthorne, 676-6021. A

Apt Bldg., 9 deluxe units, 3-bdrm. owner's unit, bltins, \$12,500 yearly gross, No. Inglewood, \$105,000. Torrance, 325-9832. A

Mustang, 1965, 289, 4-spd., tinted windshield, \$500 & take over \$66 mo. pymts. \$1750 approx. bal. Cypress, 827-7189. A

Rings, man's & lady's matching bands, white gold, florentine finish, \$50. Box 1001. A

Console Hi-Fi, radio-phonograph, \$60. Hawthorne, 676-0418. A

Ford Coupe, 1948, 1963 Chevy eng., new int., orig. paint, \$1000. Torrance, FR 8-1350. A

Appaloosa gelding, 5 yrs. old, gentle, \$300. Rolling Hills Ests., 673-1097. A

Volkswagen, 1965, radio, shoulder belts, sunroof, sedan, \$1550. Torrance, 371-9730. A

Stereo Speakers & cabinets, 5 mos. old, 10" high frequency flex edge Woofer, cambric suspension, 3" wide dispersion tweeter coupled w/an adjust. high pass filter, 3/4" plywood walnut stain, \$75. Wilmington, TE 5-9070. A

House, 3-bdrm., 2 baths, den & fireplace, near schools & shopping, \$26,500. Torrance, 375-6071. A

Beverage Dispenser, Fountainette, used once, \$150. Torrance, 835-5708. A

Lamp, pull down-type, wall mounting, black, \$4. Hawthorne, 676-0758. A

Tires, 2, Jeep, genuine, std. size, 1 new, 1 slightly used, \$50. Torrance, 321-0020. A

Pontiac, 1951, 6-cyl., std. trans., 4-dr. sedan, 1-owner, r/h, 36,000 act. miles, near new tires, \$300. Hawthorne, 644-1785. A

Chevrolet, 2-dr., 1955, h/top, good eng. & trans., needs body work, \$75. L.A., PL 5-1949. A

Falcon, 1960, auto., 4-dr. sedan, r/h, \$450. Inglewood, 679-7043. A

Washer, Easy, Model WA 222, white, never used, \$200. Manhattan Bch., 788-7519. A

Tonneau Cover for 1957 T-Bird, \$30. Woodland Hills, 348-2441. A

Pin Ball Machine, regulation-type, w/bottom flippers, all auto., \$75. Torrance, 375-6467. A

Range, Gaffers & Sattler, model #3000, white, used 3 times, \$125. Torrance, 327-9003. A

Ford, 1958, V-8, sedan, 4-dr., \$175. Hawthorne, 679-6581. A

Rambler 400, 1962, station wagon, r/h, auto. trans., w/s/w, b/seats, 43,000 miles, \$900. DA 9-9464, DA 7-8994. A

Wheelchair, E-J hvy. duty, \$50. Northridge, 349-5281. A

Chevrolet, 1959, Bel Aire, 2-dr., radio, \$450. Inglewood, 674-1847. A

Washer, Frigidaire, auto., \$25. Torrance, 834-7595 10 a.m.-3 p.m. A

Mini Bike, 2 1/4 hp Tecumseh eng., head & taillights incld., 1-yr-old, orig. cost, \$160, \$100. Fullerton, LA 6-6759. A

For Sale

House, 3-bdrm., lge. den & gar., patio, playyard, newly decorated interior, near fwy. & schools, 8 min. to Norair, good financing, \$22,750. Gardena, 329-2904. A

Chevrolet, Nomad, 1959 station wagon, auto. trans., r/h, p/s, V-8, \$650. Gardena, FA 1-0914. A

Dishwasher, portable, Lady Kenmore, used 1 yr., \$100. P.V. Ests., 377-8572. A

Accordion, 120-bass, La Scala, model 7432 TD, cost \$485, \$350. 836-4934, UP 1-0999. A

Boat, 16', w/trailer & 75 hp Scott outboard, \$1200. Inglewood, 677-6498. A

American Rambler, 1962, 2-dr. sedan, r/h, new w/s/w, low mileage, \$500. Inglewood, 674-5445. A

Icebox, factory built for camper coach, holds 25-lb. ice block, \$18. Anaheim, 714-776-3939. A

Piano, upright, Shoninger, \$150. Fullerton, 714-528-8582. A

Duplex, 1-bdrm. ea., R-3 zone, in So. Gate, \$17,500. Los Nietos, 695-7497. A

Bureau, maple finish, step up top, front louver doors covering shelf & drawers., used few months, \$175. Redondo Bch., FR 6-6415. A

Camera, Nikon, never used, incl. wide angle lense & telephoto lense, 35 auto., \$120. Box 1002. A

Coffee Table, 4', round, red leatherette, glass top, \$25. Rolling Hills, 831-9707. A

MGA Roadster, 1962, 1600 Mark II, r/h, \$1200. Port. Bend, 377-8444. A

Pictures, Western Ghost Town original drawings, framed, \$5 ea. P. V. Pen., FR 8-1863. A

Home, 3-bdrm., family rm., breakfast bar, 2 baths, patio, fenced yd., bltins, 4 yrs. old, near high school in Sun Ray area, w/ GI loan, \$1000 dn., \$22,750. Rolling Hills Ests., 375-8778. A

Acreage, near Rosamond in Antelope Valley, East Kern water distr., 10 acres, \$595 acre. Torrance, FR 8-1026. A

Ford Falcon, 1960, \$135. Torrance, 370-1788. A

Porsche Wheels, 4 16", w/turbo-disc caps & 4 Butyl tubes & 3 used Dunlop tires, \$20. Woodland Hills, 346-6675. A

Wet Suit, skin diving or surfing, for man about 6', 180 lbs., \$5. Manhattan Bch., 374-2006. A

Breakfast Bar stools, 4 w/wicker backs & seats, black steel frame, \$7.50 ea. Lawndale, PL 4-1215. A

Motorcycle, Yamaha Trail 55, 55 c.c. w/road & trail gear, 12V bat-gen. w/elec. start, book rack & skid plate, \$125. Inglewood, 674-3083. A

Chevrolet Biscayne, 1961, auto. trans., 6-cyl., r/h, \$550. Inglewood, 678-1621. A

Rollaway Bed, \$7. Hollydale, ME 3-2395. A

Dog, German shepherd male, 1 yr. old, good w/children, \$25. Torrance, 370-4947. A

Austin Healey, 3000 MK III, 1964, wood dash, wire wheels, 4-spd., o.d., new tires, mufflers, \$2400. Redondo Bch., 379-7567. A

Headboard, chartreuse & gold, frame for dble. bed, \$12. Torrance, 326-0513. A

Chevrolet, 1956, station wagon, \$125. W.L.A., 391-7781. A

Ford Galaxie 500, 1965, 2-dr. sedan, V-8, r/h, p/s, factory air, 14,000 miles, \$2495. Long Bch., 423-1363. A

Furniture, 2-tier end table, coffee table, lamp, small table, mag. rack, bar stool, 5' rm. divider, all birch or Salem maple, orig. cost \$475, all or part, \$275. Long Bch., 433-0861. A

House, 3-bdrm., all extras, recently redecorated, 25-minute freeway drive to Norair, terms, \$33,000. San Pedro, TE 3-9264. A

Lot, 80' x 100', at Snow Summit Ests., Big Bear Lake, 1 block from inn & ski area, financing available, \$6950. Fullerton, 525-1677. A

Ford, 1960 V-8, 4-dr. sedan, Fordomatic trans., r/h, good tires, new voltage reg. & gen., \$400. Torrance, 329-2521. A

House, 2-bdrm., in Westchester, lge. lot, dble. gar., near schools, shopping, 5 1/4% FHA loan, low dn., \$23,650. L.A., 645-5169. A

Cadillac Hearse, 1955, new factory-installed eng., trans., paint, 6-ply w/w tires, \$875. Northridge, 349-2021. A

Camper, 8', Alaskan, gas refrig., stove, \$750. P.V. Ests., FR 5-2775. A

Radio, Zenith, table model, AM & FM, w/AFC, \$30. Torrance, FR 1-1096. A

Volvo, PV 444, 1958, eng. good condition, \$175. Inglewood, 674-1885. A

House, in Victoria Knolls, 3-bdrm., 2-bath, lge. covered patio, bltin stove, 5 1/4% mortgage for \$18,400, \$27,500. Torrance, 325-0039. A

Utility Trailer, 3 1/2' x 7 1/2', bed, wood & steel structure, \$35. Huntington Bch., 842-2649. A

House, 4-bdrm., 2 baths, family rm., bltins, fully landscaped, 5% down, \$23,975. Thousand Oaks, 805-495-7927. A

Washing Machine, Hotpoint, needs water valve, \$10. Redondo Bch., 372-8502. A

Trailer, 1-wheel, spare tire & tube, \$50. Los Alamitos, GE 1-0843. A

House, 2-bdrm., fireplace, w/w carpet, drapes, dble. garage, \$20,950. Inglewood, OR 1-3860. A

For Sale

Poodle, female, spayed, black miniature, 1 yr. old, papers, \$40. Redondo Bch., 370-0157. A

Home, 4-bdrm., 1700 sq. ft., 2 baths, lge. kitchen, new dishwasher, walnut-paneled family rm. w/fireplace, \$29,950. Torrance, 371-9775. A

Range, O'Keefe & Merritt, chrome top, grid-dle, broiler, \$35. Redondo Bch., 370-7967. A

House, 2-bdrm., lge. R-2 lot, 160' deep, rm. for bldg., paneled living room, 5 min. from Northrop, \$17,500. Lennox, 671-1089. A

Corvair Monza, 1961, 4-dr., 61/62 eng., good t/b, r/h, \$495. Torrance, FR 5-4987. A

Chevrolet, 1955 station wagon, engine needs work, \$50. La Crescenta, 249-9387. A

Corvette, 1965, hard & soft tops, 365 hp eng., 4-spd., posi-trac., p/wind., \$300 dn., take over \$100 mo. pymts. L.A., 387-1593. A

Wanted to Buy

Avanti, 1963, good condition. Hawthorne, 644-1958. B

Utility Trailer, lge. U-haul type, either open or covered, with or w/o hvy. duty hitch., consider suitable vacation trailer shell. Hermosa Bch., 374-5425. B

Chevrolet, 6-cyl., 4-dr. stand. shift, w/eng. in good mech. cond. L.A., 384-7950. B

Encyclopedia Britannica or Americana published after 1958 w/year books. Westminster, 714-892-5801. B

Want to buy evaporator-type cooler for house trailer. Gardena, 635-3127. B

Adding Machine, elec., in good condition. Manhattan Bch., 376-4787. B

Automobile, low mileage, any year. Inglewood, OR 2-4486. B

FREE (To Be Given Away)

Kittens, 8, yellow, blue eyes, 6 wks. old. Redondo Bch., 372-8334. D

Dog, miniature collie, male. Manhattan Bch., FR 6-9964. D

Rentals Offered

Vacation Cabins, Idylwild, secluded, creek, patios, \$20 weekend, \$50 wk. & up. L.A., PL 4-5288. E

House, 2-bdrm., furn., dble. gar., 4 blocks from beach, \$135 mo. Gardena, DA 4-7688. E

House, 2-bdrm., unfurn., stove & refrig., children OK, avail. June 20, \$125 mo. Hawthorne, 595-3013, 675-3901. E

Bachelor Apt, 1-bdrm., furn., fenced yd. & patio, within walking distance of Norair, \$85. Manhattan Bch., FR 6-2122. E

Apt, 2-bdrm., parking space, children OK, no pets, \$100 mo. L.A., 670-4473. E

Home, exec.-type, 3-bdrm. & den, 2200 sq. ft., family rm. & kitchen, 2 baths, sep. dining rm., bltins, 2 1/2-car gar., in Lawndale, \$275 mo. Torrance, SP 2-5628. E

House, 3-bdrm., 1 1/4 bath, newly decorated, near La Mirada shopping center, \$155 mo. Torrance, FR 1-1308. E

Studio Apt, 3-bdrm., 2-bath, unfurn., pvt. patio, closed gar., hobby shop, trash & hot water pd., children accepted, \$165 mo. Torrance, FR 5-0867. E

Apt, 3-bdrm., 2 baths, vicinity Pico & La Cienaga, \$175 mo. L.A., WE 5-4006, WE 5-9148. E

Apt, unfurn., 1-bdrm., bltins, including refrig., laundry facilities, gar., 15 minutes to Northrop, adults, \$90. Redondo Bch., 379-0979. E

Apt, deluxe, 3-bdrm., 2 baths, family rm., fireplace, pvt. patio, bltin units, intercom, dishwasher, f.a. heat, hot water & trash pd., near Norair, \$175. Hawthorne, 679-1358. E

House, 2-bdrm., fenced yd., trash & water pd., no pets, \$105 mo. Lawndale, 371-6775. E

Vacation Cabins, Lake Gregory & Crestline, make reservations early for May thru Sept., \$25 weekends, \$60 wk. Venice, EX 1-2040. E

Apt, 2- & 3-bdrm., furn., lge. rooms & closets, only 4 short blocks to Northrop, all utilities pd., \$125 & \$155 mo. San Pedro, TE 3-2512. E

House, 3-bdrm., 1 1/2 bath, 2-car gar., 1 mile from beach, rent or lease, \$175 mo. Hollywood Riviera, FR 5-9676. E

Child Care Wanted

Need to live in & care for 4 school age children during summer, June 1 to Sept. 1, dependable, mature. Orange, 633-4378. H

Personals

Ironing, my home, \$10 a piece, \$15 dresses. Inglewood, 671-2584. L

We wish to express our sincere thanks to our Nortronics friends for their kindness & sympathy at the recent death of our father. KIT & JILL KITTO. L

We would like to express to all concerned our sincere thanks for the beautiful flowers & expressions of sympathy at the death of your co-worker, Harold E. McDonald. THE McDONALD FAMILY. L

Flight Safety engineer wants to exchange maintenance work on light aircraft for flight time. F.A.A. licensed A & P mechanic. Hawthorne, 644-2592. L

Instr. Pilot flying Bonanza to East Coast June 8-15, need passengers to share expenses, \$140 ea. rd. trip. Hawthorne, 379-7563. L

Personals

To all my many wonderful friends throughout Nortronics, I want to thank you for the donation to The City of Hope & for your sympathy & kindness shown me at the loss of my mother. RUTH FORSTROM. L

Housekeeper wanted, for elderly couple, live in, 3-bdrm. home, light housework, must be able to drive, \$200 mo., 5-day week. Inglewood, 673-1133. L

For Sale or Trade

Ford XL, 1964, h/top, b/seats, air cond., p/s, Vibra-sonic radio, \$2000 or trade for late model pickup truck. Torrance, 323-9571. M

Sailboat, 16' Skimmer class, many extras, new dacrons, trailer, \$650 or trade for small sedan or sports car. Garden Grove, 714-539-2098. M

Tires, Michelin X, 4, almost new, 6.40 x 13, w/tubes, \$100 or trade for 4 good tires any make & \$75, avail. about June 1. Huntington Bch., 714-847-2648. M

MG-TF 1500, new top, Pirelli tires, wire wheels, wood & chrome steering wheel, transistor radio, rebilt. eng., \$1200 or consider trade on Mustang, Austin Healey, MGB or Jaguar XKE. L.A., 657-3074. M

Comet, 1962, 2-dr. 6-pass. custom sedan, \$750 or trade for late model station wagon. Buena Pk., 527-1201. M

Going my way?

Rides Wanted

8 a.m. — 4:45 p.m.

Hawthorne & Hwy. 101, Torrance. Sandy Parmdee, Nortronics, ext. 387, 375-2018. 5

Topanga & Van Owen, Canoga Park. Stanley J. Ehlinger, Nortronics, exts. 461, 462, DI 8-3289. 5

Lincoln & Knott, Anaheim. Interested in starting 2-man car pool, own sports car. A. Wood Rigsby, Norair, ext. 4757, 714-527-8515. 5

Crenshaw & Century, Inglewood. Marjorie A. Nelson, Nortronics, exts. 563-564, 671-6732. 5

Orange Ave. & Del Amo Blvd., Long Beach. W. H. Covert, NSL, ext. 2721, 423-1363. 5

La Brea & Jefferson, L.A. Howard Kornblue, Norair, ext. 2024, WE 9-3519. 5

Rides Offered

8 a.m. — 4:45 p.m.

Lincoln & Knott, Anaheim. Interested in starting 2-man car pool, own sports car. A. Wood Rigsby, Norair, ext. 4757, 714-527-8515. 15

Topanga & Van Owen, Canoga Park. Stanley J. Ehlinger, Nortronics, exts. 461, 462, DI 8-3289. 15

Orange Ave. & Del Amo Blvd., Long Beach. W. H. Covert, NSL, ext. 2721, 423-1363. 15

La Brea & Jefferson, L.A. Howard Kornblue, Norair, ext. 2024, WE 9-3519. 15

Real Estate Talks Draw High Praise

Enthusiasm ran high among the 100 Northrop people who turned out for the initial session in a series of real estate investment lectures sponsored by Northrop Recreation Club last week.

The series will continue meeting each Tuesday (5 to 7 p.m.) at NRC Clubhouse, Hawthorne, for at least eight more weeks.

Employees and their families may enroll at any time. The cost is \$10 per person or \$15 for husband and wife.

Taught by leading experts in the investment field, the series is tailored to the individual with information on all types of property investments, hints and suggestions, pitfalls and promising areas, plus general information such as legal and financial arrangements.

Those taking part in the first lecture offered such comments as "ideal, just what I wanted," "the answers I have been seeking," and "the finest coverage of a topic I have ever heard."

Three-Day Weekend

All Northrop Corporation personnel will observe a holiday Monday, May 30, in honor of Memorial Day. Only those employees notified in advance will be required to work.

KEGLERS DISPLAY FRUITS OF FUN AND LABOR



Winners of Conejo bowling titles received trophies recently at conclusion of winter leagues sponsored by Northrop Ventura Recreation Club. In photo at left, Mixed Four champs—Tom and Loretta Clanin, Clarence Mapes and Alice Walta—display trophies won in competition with nine other teams. At right, are men's Scratch League champs—Ralph Friesen, Mr. Mapes, Mike Lewis and Al Cummins. Two



other leagues—West Valley and Camarillo—were won simultaneously by NVRC. Winning team at West Valley was composed of Lois and Bob Keefer, and Marge and Hank LaPage. Winners at Camarillo were Elaine and Mike Novak, and Millie and Ken Burnside. More than 200 Northrop Ventura employees participated in winter league competition according to Zack Silvers, bowling commissioner.

COMPUTERS: A Versatility Never Before Obtainable

(Continued from page 1)

need for maintaining elaborate computer complexes at all Northrop locations, and is important to the modern concept of a centralized data processing complex in a large corporation," Mr. Lotz said.

"In fact, by early 1967—less than 12 months away—the smaller computer models at Northrop's outlying sites will be able to process voluminous business and scientific data "on-line" with the 360/65.

"In other words, information which cannot be handled locally will be processed directly to and from Hawthorne, without any intervening steps. What is more, Anaheim or Newbury Park work—for example—may be receiving its solution simultaneously

with other work in the computer. This is due to the new multi-programming feature of the 360/65."

The 360/65 will be supported by the two smaller 360/30 systems which are now operational at Hawthorne. This support will be further augmented later this summer with the planned installation of model 30's at Anaheim and Newbury Park. This total equipment network will afford Northrop with a complete and modern computer capability.

Preparatory to the installation of the new equipment, key computer operators have been en-

gaged in a training program on a five-hour-a-week schedule. At the same time, key NDP business and scientific programmers have been receiving an intensive orientation within the department and at IBM headquarters. Indoctrination courses are also being conducted for other interested computer users throughout the corporation.

"The 360/65 system was selected only after detailed and careful study of Northrop's needs and investigation of the equipment best suited to those needs," said Paul Wierk, head of the Data Processing department and

corporate director of Management Information.

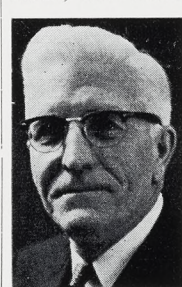
"Early in 1965 a corporate task force had begun a review of these two considerations and by August of last year came up with the recommendation for the selection of the 360 system," he added.

"With this third-generation computer, all of us look forward to getting our work done more accurately, faster and with a flexibility not available to us before," Mr. Wierk said. "It comes at a favorable time, paralleling and aiding the growth of other Northrop technologies and achievements."

AT NEEDHAM, MASSACHUSETTS

Quayle Heads Redesignated Department

Northrop Nortronics Marine Equipment Department at Needham, Massachusetts, has been redesignated the Needham Department, and Thomas H. Quayle has



Mr. Quayle

been appointed a Division vice president and manager of the department.

In making the announcement recently, Northrop vice president and Nortronics General Manager Fred Stevens said the change was in keeping with the expanded product base of the new department.

Mr. Quayle was one of the original 10 Northrop employees

when the company was formed in 1939. At that time he was a preliminary design engineer on the famed N3PB seaplane which Northrop built for Norway.

In his long and varied managerial career with Northrop, he has served as vice president and manager of Northrop's Anaheim facility, corporate vice president of Commercial and Industrial programs, and most recently, assistant to the Nortronics general manager.

Among the diversified products of Needham Department are automated ship control systems, helicopter armament systems, shipboard receivers which will be used in tests of the Navy's Omega navigation system, and five different subsystems for inertial

navigation systems on Apollo tracking ships.

Needham Department is a pioneer in the burgeoning technology of automated ship control systems and is designing and producing equipment for six Grace Line cargo ships.

Helicopter armament systems are being produced for the Army's UH-1B helicopter and consists of two mounts, each supporting two machine guns.

Star tracking systems being produced for tracking ships to be used in the Apollo moon program include a new star sensor developed by Nortronics Palos Verdes and associated equipment produced by Needham under contract to Sperry Gyroscope Company.

SOFTBALL SEASON STARTS IN JUNE; PRACTICES BEGIN

Northrop Ventura's entry in the Conejo Valley softball league will be trying to keep alive a winning streak which began last year when it opens the 1966 season June 20 at Thousand Oaks High School.

The team, managed by Softball Commissioner Chuck Taylor, won its last four games of the 1965 season to finish in second place in Class AA.

First practice of the new season was held this week, but Manager Taylor reminded that players are still needed. Practice will continue through this month and early June, with preseason games currently being scheduled.

Once the season gets under way, the team will play one night a week. Frequency of practice sessions until then will be determined by the players themselves, Mr. Taylor said.

Interested players can sign any of a number of lists on bulletin boards throughout the Division facility or call Mr. Taylor.

It is also hoped that a girls' team can be formed, and applicants should contact Mr. Taylor or Herb McKinney.

FDR BOUGHT FIRST

Next year marks the 25th or Silver Anniversary of U.S. Savings Bonds. The first Series E bond was sold to President Franklin D. Roosevelt on May 1, 1941.

HALLICRAFTERS

(Continued from page 1)

Actual number of Northrop preferred shares to be issued is subject to the results of an independent audit and agreement on other related aspects of the proposed acquisition.

First announcement of negotiations between the two companies was made last January. Hallicrafters employs approximately 1400 persons in producing electronic countermeasures equipment, short-wave radio communications systems and other electronics equipment.

Squadron of Fighters Could Park on 747

More than a squadron (12 aircraft) of Northrop-built F-5 jet fighters would be required to stretch to the perimeters of the Boeing 747 jetliner.

Five F-5's parked nose-to-tail would not extend the full fuselage length of the 747; seven F-5's parked wingtip-to-wingtip would not be as wide as the wingspan of the 747; and four F-5's stacked atop one another would fall about 10 feet short of the highest point of the 747's tail.

The fuselage section Norair will build for the 747 is half the length of a football field, 20 feet wide, and approximately as tall as a two-story building.

\$49 BILLION INVESTED

Tens of millions of Americans own United States Savings Bonds. The value of Series E and H Bonds outstanding is now 49 billion dollars.

APOLLO: Docking Experiments Require ELS Revisions

(Continued from page 1)

development of two different techniques which are designed to attain the solution to this problem.

"The first technique involves packing from the bottom of the deployment bag, as was done on Block I, but incorporating a divider in the middle of the bag to separate the parachute canopy from the suspension lines," Mr. Boulanger said.

"The second approach involves packing from the side or end. While there is no Apollo experience with this approach at this time, it is hoped that the constant cross section will permit the nylon fabric to be more easily and safely packed, thus resulting in a higher consistent density and a

more efficient use of the volume available."

The new parachute envelope required the total redesign of the Retention System, according to Bill Bjerke, Fabric Design lead engineer. The new Retention System is designed to provide a major improvement in operational capability and a major reduction in over-all weight and volume.

NAA/S&ID has relocated and redesigned some of the Earth Landing System compartment equipment to permit the installation of the eight Apollo parachutes into the smaller ELS compartment.

A single disconnect cluster-riser attach fitting is now used

to attach two drogue risers and three main risers to the Apollo command module.

The drogue and main riser disconnects are now furnished by NAA/S&ID as an integral part of the disconnect cluster-riser attach fitting. This change has necessitated the conversion from a multilayer nylon and dacron fabric main parachute riser to the use of a steel cable riser by Northrop Ventura, according to Dick Kipp, Mechanical Design lead engineer.

The Block II Earth Landing System includes many of the previously qualified Block I components. Further development testing will be performed to evaluate the changes to Block I

hardware and to develop the new hardware required to satisfy the Block II mission requirements.

The Block II ELS engineering team has passed the first major contractual milestone with the completion of the Phase I Design Reviews.

The Block I program design hardware and the newly developed Block II hardware will be subjected to a series of final qualification aerial drop tests later this year.

The successful qualification of the Block II Earth Landing System will permit Northrop to proceed into the Apollo program's next phase of production. These Earth Landing Systems are scheduled for use on future Apollo lunar missions.

NORTHROP NEWS

NORTHROP VENTURA

Published biweekly by Northrop Corporation, Beverly Hills, California

Vol. 24, No. 11

June 8, 1966

F-5's Wing 11,200 Miles To Ethiopia

The first Northrop F-5 tactical fighters programmed for Ethiopia were flown recently to that country from California, a distance of 11,200 miles, in the longest F-5 "high flight" deliveries made to date.

Ethiopia became the latest allied nation to obtain an initial quantity of this supersonic fighter, to modernize its air force. F-5's began entering the defense inventories of free world countries in early 1965.

The fighters left McClellan Air Force Base, California, near Sacramento, flew to the U.S. east coast and then crossed the Atlantic via the northern route to their final destination of Harar Meda Air Base, Ethiopia. Crew rest stops were made in Europe, Iran and Saudi Arabia. The F-5's flew at an altitude of 30,000 feet or higher during the flights.

Four of the aircraft, which comprised the first of two delivery elements, participated in fly-by ceremonies shortly after arrival, celebrating Ethiopia's National Liberation Day.

Although jet-experienced, a majority of the USAF pilots who delivered the aircraft half way around the world had never before flown the versatile F-5—except for a one-hour familiarization flight in a two-place F-5B shortly before beginning their mission.

This unusually brief checkout was possible due to the F-5's relatively simple operational procedures. Three other USAF pilots also delivered additional F-5's to Norway recently, after similar one-hour orientation flights.

Under new delivery procedures, F-5's for allied nations in Europe, the Middle East and Africa are now flown to destinations. It is estimated that this will save 30 days or more in delivery and flight readiness time requirements.

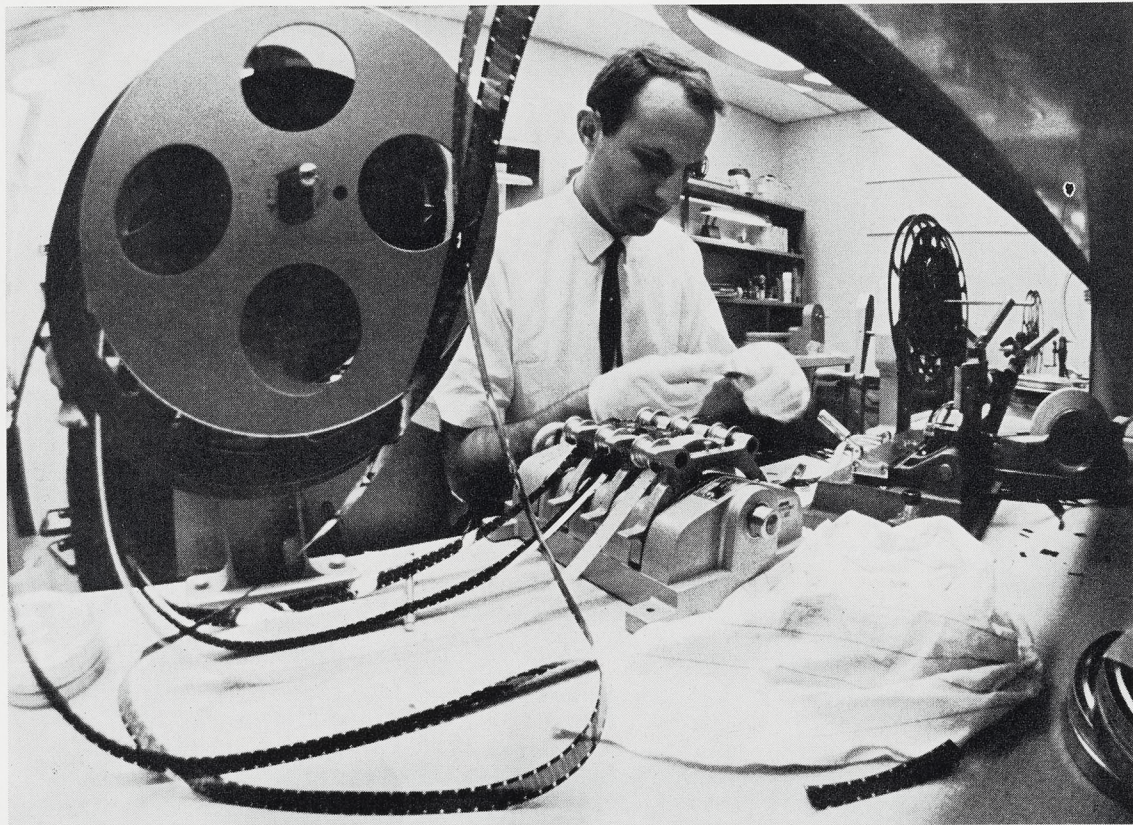
Apollo Boilerplate Model Arrives for ELS Testing

An Apollo Block II simulated spacecraft, the Boilerplate 6B, has arrived at Northrop Ventura and is being equipped for testing of the Northrop-built Earth Landing System (ELS).

The five-ton test vehicle is the exact size and shape of the Apollo spacecraft, scheduled to take three astronauts to the moon and back by 1970.

The spacecraft arrived on schedule May 31, after being trucked from North American Aviation's Space and Information Division assembly plant in Downey.

The capsule was unveiled last Wednesday, and installation of equipment began this week, according to Lou Florence, Northrop Ventura Apollo project administrator.



UNWINDING—Northrop Ventura photographers had opportunity to play dual role—as technicians and artists—during Block I of Apollo program. In addition to operating camera as a scientific instrument of measurement on tests, they put together a documentary movie from bits

and pieces of their film library. Entitled "The Last Five Miles," the story of development of the Apollo Earth Landing System has been described as a work of art by most viewers. Tom Smalley (above) is editing portion of more than 5000 feet of Apollo documentation film.

RESEARCH TOOL

Camera Offers Armchair Analysis

Northrop Ventura's Arts and Graphics Services branch has two million feet of motion picture film and 44,000 "still" photos that says its team of seven camera and lab men play an important role in the development of Division products.

"The value of the camera as a tool in research and development is firmly established," says Supervisor Curley Martin. "As for its value to parachute landing systems, it should be remembered that those critical moments of parachute deployment and disreefing occur at altitudes between 5000 and 10,000 feet during drop tests.

"By having automated cameras on board the test vehicle, in the case of Project Apollo, engineers and analysts can study every op-

eration of the drop test from arm chairs just as thoroughly as if they were up there themselves."

At the same time, ground cameras, with 70-inch lens, record the entire Apollo drop test sequence. The Hulcher cameras, which use 70mm film to record up to 20 frames per second, can "pick up" shroud lines of the parachutes from eight miles away.

The three cameras on board, which take 16mm movie film, are set into operation by the Earth Landing System (ELS) sequence controller at key moments in the drop operation. Because of the location of reefing line cutters, one of the cameras has a unique lens assembly which literally takes pictures around a corner.



Mr. Martin

Another use of the camera on Project Apollo is as an instrument of measurement. When ELS engineers wanted to know how fast a drogue mortar ejected a chute, Curley's group set up shop on a 30-foot tower.

The mortar, which is a device used to fire the parachute container clear of a descending vehicle for unimpaired deployment, was set up on the ground. Since the number of frames per second being exposed by the camera is a fixed point of reference, as well as the location of the camera, the whole operation of firing a drogue mortar could be viewed graphically in increments of a fraction of a second.

One camera, which can record up to 5000 frames per second, is used to slow down events that happen too fast for the human

Because of the location of reefing line cutters, one of the cameras has a unique lens assembly which literally takes pictures around a corner.

are set into operation by the ELS sequence controller at key moments in the drop operation.

"Even if you can see an event," says Mr. Martin, "you can only see it once, and it may be seen a dozen different ways if you have a dozen different people watching.

"The camera gives everyone an objective record which they can look at as many times as they wish."

All of the movie films are in color and in the case of the Cloverleaf steerable parachute, color offers an important clue to system performance. It distinguishes the controlling flap on one of the chutes' three lobes

(See GRAPHICS, page 6)

Drone Team In Pacific Commended

Northrop Ventura's Pacific Target Operations has been praised once again for its "exceptional support" of U.S. Army missile exercises in Korea.

A score of Ventura employees—both pilots and ground support specialists—are presently based in Hawaii after a 10-month tour of missile installations in the Pacific, where they launched supersonic target drones (AQM-38A) produced by the Division.

In a letter to Rod Hoover, supervisor of Target Operations, the commander of the 30th Artillery Brigade, Brigadier General James S. Billups, Jr., said:

"... As in years past the target support provided by Mr. Shaw (L. W. Shaw, Ventura field supervisor) and his group was outstanding... Each drone launch was made on time and flown at requested altitude, speed and direction... This outstanding support can be directly attributed to the splendid efforts, the spirit of cooperation and consistent desire for efficient operation which was exhibited by your personnel..."

While words of praise from military organizations may not be new to the Target Operations group, Mr. Shaw indicated that the fiscal 1966 tour was one of the most successful in the operation's history.

Mission reliability of the targets reached 93 percent this year, he said.

Mr. Hoover and Mr. Shaw attributed the record to a continuous target improvement program, which consists of recommendations from the field and implementation of improved techniques or components on the drone production line.

In addition to a growing file of letters which commend the Ventura operation, the group last year received a plaque from the Republic of China. It was "presented as a token of appreciation for your outstanding services and forceful support in conducting ASP (annual service practice) of the Chinese Army."

(See DRONES, page 6)

SUZANNE CAPELLI, DIANE EWING WIN MANAGEMENT CLUB GRANTS

The annual B. J. Angell and Vivian Long Memorial Scholarships will be presented Friday to two seniors at Thousand Oaks High School.

The awards, sponsored by the Northrop Ventura Management Club, will go to Diane Ewing, daughter of Edgar G. Ewing of Engineering, and to Suzanne Capelli, daughter of Mrs. Wanda Musgraves of Marketing.

The Angell Award—honoring the late B. F. Angell, Management Club president—will go to Miss Ewing. It is worth \$750.

The \$250 Long Award, named for the late Mrs. Vivian Long, former librarian, will go to Miss Capelli.

W. H. Young, president of the Management Club, will make the presentations at the annual Thousands Oaks High School Senior Awards night.

Both awards were based on scholastic achievement, a 1500-word essay on any subject the entrant chose, extra-curricular activities and a faculty evaluation.

There were 12 contestants.

Both winners and their parents were guests of the Management Club on June 1 at the group's monthly meeting.

Miss Ewing plans to attend San Jose State College. Miss Capelli intends to enroll at Pacific University, Seattle.

CASA PIONEERS IN EUROPE

Automated Data Control in Spain

Construcciones Aeronauticas, S.A. (CASA) of Spain has taken initial steps involved in the implementation of one of the most advanced Automated Production Control systems of its type in Western Europe.

This system, utilizing an IBM electronic computer and advanced peripheral equipment, will be utilized for high-speed document preparation and source data collection.

CASA, one of Europe's leading aerospace firms, and Northrop Corporation are cooperating in a production program to supply 70 Northrop F-5 fighters to the Spanish Ministry of Air. Most of the production will center at CASA facilities at Getafe and Seville.

This completely integrated Automated Production Control System will be used for such business functions as preparation of a master product de-

finition file, preparation of a master schedule file, production order release, production control, material requisitioning, purchase order and receiving control, inventory control, material requirements analysis and cost control.

Following acceptance of the system, a program to select, train and establish a computer systems and programming staff was instituted. Ten CASA tech-

nicians are currently attending special courses on computer programming.

A second major step is the acquisition of new equipment. Toward this end an extensive final equipment evaluation program is in progress.

Mike Nolan, a member of the Northrop team in Spain, has worked extensively in the initial planning for the system.

Coordinating over-all efforts in the planning between Northrop and CASA organizations on data processing activities has fallen to Tak Yamashita, director of Programming for Northrop Data Processing.

"CASA recently requested further assistance in this program in the form of an experienced programmer to work in Spain for the remainder of this year," Mr. Yamashita said.

For this assignment Mr. Yamashita has selected Jesus Noguera, an experienced Northrop Data Processing programmer. Mr. Noguera is a native of Spain and former student at the University of Madrid as well as an electrical engineering graduate of Northrop Institute of Technology.

Mr. Noguera will report to CASA approximately July 1.

"Mike Nolan has done a very good job in helping plan for this system," Mr. Yamashita added. "And the Northrop-CASA working relationship, as exemplified in this new system, has been a harmonious and rewarding one."

Federal Program Trainees Visit Northrop Ventura

Twenty-five machinist trainees toured manufacturing facilities at Northrop Ventura last week as part of the federal Management Development Training Act.

The trainees, who meet in class regularly at Ventura Union High School, were shown the operation of mills, lathes, turret lathes, shapers, profilers and other machine shop equipment.

Accompanying them were Al Robinson, former machine shop supervisor at Northrop Ventura, now an MDTA instructor, and Walt Zorovich, supervisor of the local MDTA program.

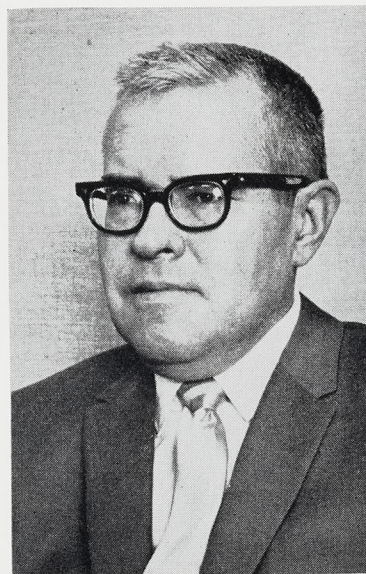
Johnnie Via, NV personnel representative, arranged the evening tour, which also included the showing of a movie on Northrop Ventura's part in aerospace recovery systems.

Floating Holidays Assigned for 1966

Northrop Corporation's two floating holidays for 1966 have been assigned.

One will be Friday, November 25, which means a four-day holiday in conjunction with Thanksgiving Day, a regular holiday.

The second floating holiday will be taken December 26. Which means the yearend holiday will begin with the conclusion of work shifts December 23 and continue until January 3, a Tuesday.



Dr. Theodore Bullockus has been named associate director of Northrop's Organization for Development Assistance Programs (ORDAP). Dr. Bullockus formerly was chief of economic analysis at Douglas Aircraft Company, Santa Monica. ORDAP, headquartered in Beverly Hills, is headed by James L. Taylor and provides contract services in development research, planning and program support to free-world nations. Dr. Bullockus will be primarily responsible for investigation of potential ORDAP programs in Africa.

National Committee Names Roland Scott

Roland B. Scott, Northrop Norair Community Relations coordinator, has been appointed to a second three-year term as a member of the President's Committee on Employment of the Handicapped.

This committee is composed of representatives of labor, industry, business, civic veterans and fraternal organizations who promote the hiring of handicapped individuals. It was founded in 1947.

DEEP SEA QUEST, SST ON AEROSPACE TELEVISION SERIES

Latest developments in aerospace technology will be explored throughout the month in a series of hour-long television programs on KCET, Channel 28.

At 7 p.m., Friday, Dr. Martin Klein, moderator, will present films on deep-diving submarines.

At 9:30 p.m., June 14 and again at 7 p.m., June 17, the topic will be "Deep Quest and Deep Submergence Rescue Vehicle."

"Microelectronics," and the methods used in developing them, will be the subject on June 21 at 9:30 p.m., to be repeated at 7 p.m., June 24.

The supersonic transport plane, Concorde SST, being built jointly by a French and a British company, will be reviewed at 9:30 p.m., June 28 and again at 7 p.m., July 1.

Previous programs which have been of interest to Northrop personnel have covered lifting bodies, such as Northrop's M2-F2 and HL-10, and the Gemini and Apollo projects, in which Northrop plays a major part.

Dance Class to Open

A new series of ballroom dance lessons open to all Northrop families begins June 16 at NRC Clubhouse, Hawthorne, for a 10-week period.

The cost is \$5 per person for each course.

RELIES ON EXPERIENCE AND INSTINCT

The Test Pilot: Judge and Juror at the Pressure Point

There is a point—which might well be called a pressure point—when all the efforts involved in the creation of an aircraft system focus on a single factor.

That factor: flight test.

Obviously, a polygenetic array of talents are employed in arriving at this point. They provide detailed engineering, procurement, fabrication, assembly, testing, inspection and verifications. They create, build and check out the system through a long and detailed process. And there always remains a bit of each individual contribution in the total system.

Yet, in the final analysis, as flight test begins, the role of judge and juror rests largely with one man, the test pilot.

His keen sense of judgement must determine how well the system performs its assigned mission. And he can never lose sight of customer requirements in any decision he makes.

To fill such a role requires an unusual type of man.

Northrop Norair has a six-man team of test pilots, plus one demonstration pilot, all reporting to R. M. "Bob" Elder, director of Flight Operations.

They are, in the words of Welko Gasich, Norair's vice president—Technical, "the very best in the industry, outstanding men in every respect."

This team is extremely versatile. With in its ranks are men capable and qualified to fly almost any type of aircraft—fighters, bombers, large transports, helicopters, seaplanes and even the newer V/TOL types. It is also flexible. While working in specific areas of re-

sponsibility, the pilots often switch jobs to meet special requirements. And they operate all types of aircraft being tested by Northrop today.

In addition to an average of 15 years of flying experience per man, the team is composed entirely of former pilots of military services and has a high complement of men who graduated, often with honors, from military test pilot schools.

Norair test pilots are engineers, many with higher degrees or specialized courses in the physical sciences. And most have worked at one time or another in engineering fields other than flight test.

Mr. Elder, H. E. "Hank" Chouteau, R. G. "Dick" Thomas and W. A. "Bill" Anderson handle a majority of the engineering flight test assignments. John Januleski, supervisor, and Darrell Cornell handle Production Flight Acceptance tasks. C. C. "Casey" Finnegan flies most of the aircraft demonstration

program missions.

"Our pilots are shifted from one assignment to another if and when program requirements make it necessary," Mr. Elder said. "This capability is an important one which enables us to carry out special test programs without delay."

Mr. Elder is a retired U.S. Navy captain, a graduate of the University of Washington, and former skipper of the attack carrier USS Coral Sea. Honor graduate (1952) of the Naval Test Pilot School, Mr. Elder pulled three duty tours in flight test operations at Patuxent River NAS, including one as director of Flight Test. He commanded two fighter squadrons and an air group and helped qualify many of the Navy's fighter aircraft for carrier operations. He served in the Navy 23 years.

Mr. Chouteau is a former Air Force fighter pilot and a graduate of the Air Force Experimental Flight Test Pilot's School. He also holds a degree from the

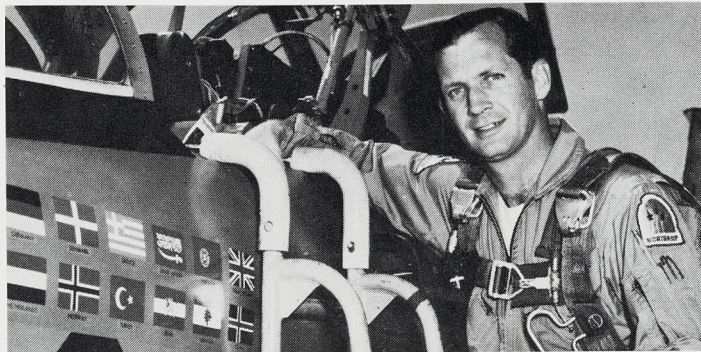
University of Wyoming. Since 1952 Mr. Chouteau has flown for Northrop, first on the Snark program, then at Edwards Air Force Base since 1956. He flew the initial flight of the YF-5A aircraft in 1963 and has carried out many flight test programs over the years. As chief test pilot, he is responsible to Mr. Elder for the functioning of the test pilot group which includes both engineering and production flight test.

Mr. Januleski is a graduate of the United States Military Academy at West Point and a former Air Force pilot. He began flight work with Northrop by flying F-89's in support of drone aircraft programs and later was assigned to the Production Test facility at Palm-dale. He also serves as an F-5 demonstration pilot in addition to his duties as supervisor of Production Flight Acceptance.

Mr. Thomas began test flying in 1956, first with Beech Aircraft, then (See TEST PILOTS, page 3)

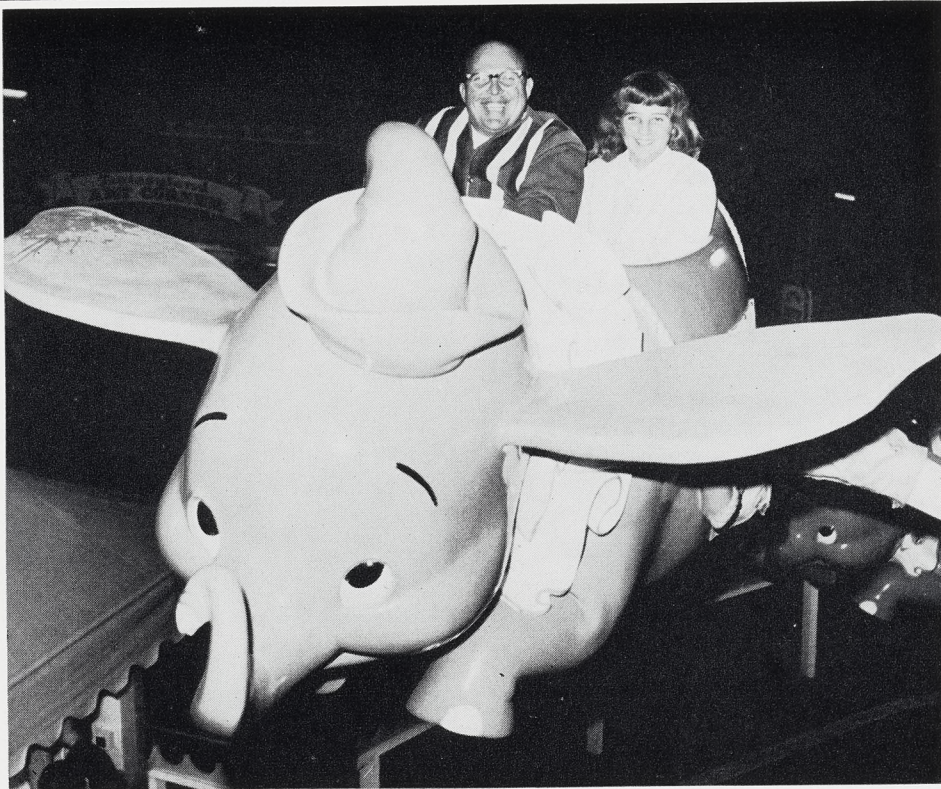


Mr. Elder

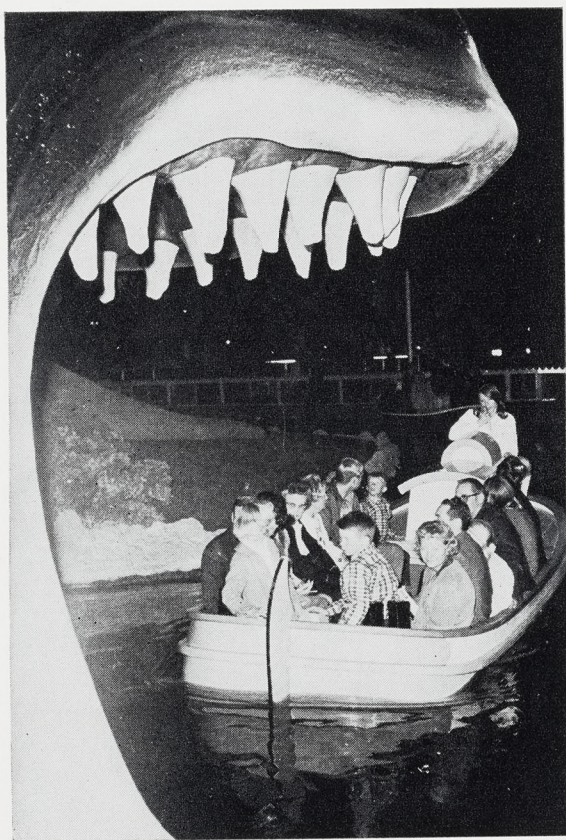


Casey Finnegan (above) stands by F-5B demonstration aircraft with portion of flags representing nations in which he has flown. Hank Chouteau (left) is chief test pilot, and John Januleski (right) supervises production flight acceptance tests.





More than 8000 persons attended the third annual NRC night at Disneyland May 27, which sponsors called the ideal crowd and the ideal night.



TEST PILOTS: In the Final Analysis They Call the Shots

(Continued from page 2)

with The Boeing Company. He joined Northrop in 1963 and has carried the primary test pilot responsibility for a number of engineering flight programs on the F-5 aircraft. A graduate of Parks College and the Naval Test Pilot's School, Mr. Thomas was a fighter pilot with the U.S. Air Force from 1952 to 1956.

Mr. Finnegan, a graduate of North Dakota State University, served for five years as a USAF fighter pilot. He is currently a pilot with the U.S. Naval Reserve. Mr. Finnegan was an engineering test pilot at Northrop Ventura prior to working in Norair Customer Relations and accepting his present post.

Mr. Cornell holds bachelor and master's degrees from North Dakota State University and is a former U.S. Air Force pilot. He flew with Ventura Division drone support groups around the world prior to joining Norair a year ago.

Mr. Anderson is the latest addition to the test pilot team. He is a graduate of England's Williams College and the Empire Test Pilot's School. He flew 13½ years with the Royal Air Force, including extended periods as a test pilot. Mr. Anderson was with the U.S. Army Aviation Test activity prior to joining Northrop. He has had extensive experience in helicopters and V/TOL aircraft.

Northrop's two major aircraft sys-

tems—the T-38 trainer and F-5 fighter—are good examples of the extremes in aircraft testing today.

The T-38 was designed without frills to provide a capability for supersonic pilot training. Its test program, while extensive and complete, was not overly complicated.

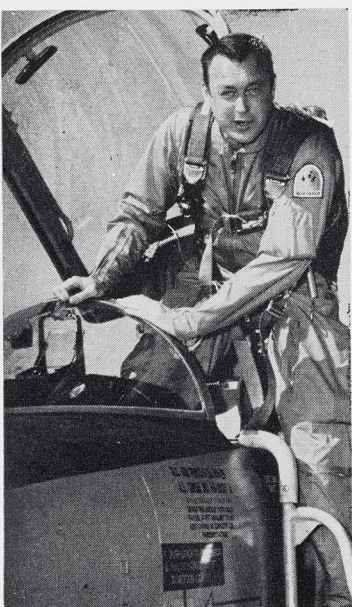
The F-5, on the other hand, was designed to incorporate all of the T-38's better features, plus the capability to deliver armament and to defend itself against attack.

Because Norair test pilots have flown extensively for military organizations in war and peace, they have an intimate feel for what the customer wants and needs in an aircraft. And they augment this knowledge with frequent personal contacts, plus trips to areas where Northrop-built aircraft are in service. These factors, coupled with their engineering background, enable them to make many suggestions of a precise nature, to the designer or the production unit involved.

"We probably have more across-the-

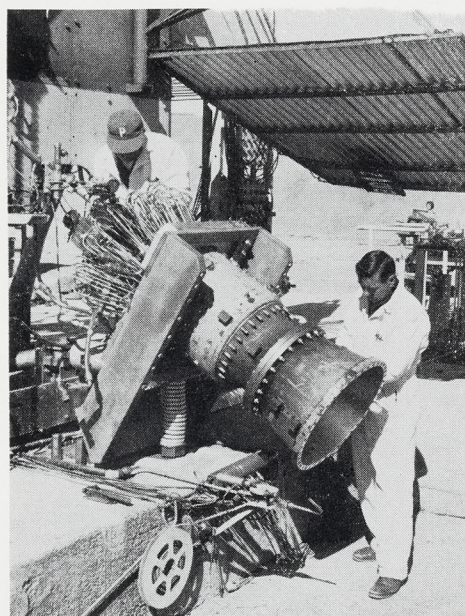
board contacts with various groups than just about any organization you can name," Mr. Chouteau said. "We like it that way. It not only gets better results but allows us to develop a more complete understanding of Norair's broader aims and accomplishments.

"Naturally, we must sometimes carry bad news. However, this advanced information allows us at Northrop to better anticipate customer reaction and to achieve the goal we are all striving for—the best aircraft we can build."

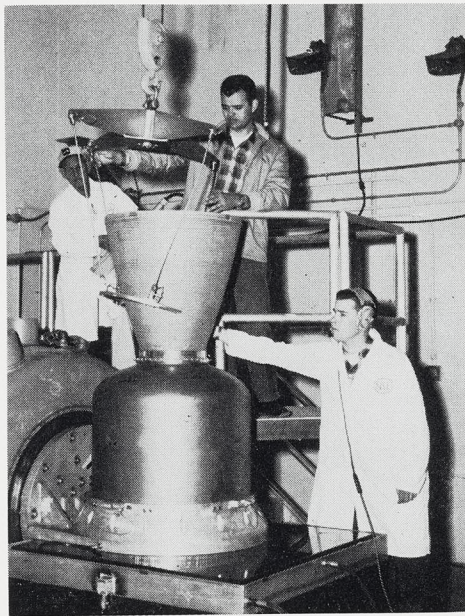


Dick Thomas (above) and Bill Anderson (left) assist Bob Elder and Hank Chouteau in engineering flight test assignments, while Darrell Cornell (right) specializes in production flight acceptance. All pilots fly all types of missions, however.

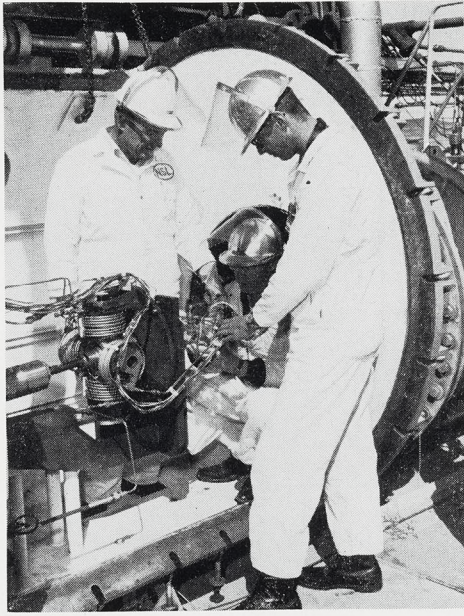




Resonant combustion rocket engine will be tested after installation on stand is completed by Bob McKeon (left) and Neil Eckenrode of Northrop Space Laboratories.



Vibration testing of Applications Technology Satellite (ATS) apogee motor is conducted by (from left) George Brothers, Phil Dee and Denis Orser.



Advanced Liquid Propulsion System (ALPS) thrust vector alignment stand is installed by (from left) Larry Whalen, Sam Penrod and Jim Lumsden.



For efficient operation of NASA/JPL Edwards Test Station, supplies must be kept readily available. Taking inventory are Walt Hubble (left) and Ed Blaty.

AT EDWARDS TEST STATION

Desert Rats and Exotic Rockets

Today Northrop Space Laboratories technicians are testing the Surveyor vernier propulsion engine and an advanced design propellant tank for possible use on Voyager. Tomorrow they will process and test a propellant batch for the Advanced Technology Satellite apogee-kick motor. The next day they will perform firing tests on JPL's Advanced Liquid Propulsion System.

These are some of the tasks assigned to Northrop's Bill Dickinson and his team of rocket propulsion specialists at Edwards Test Station (ETS). This team provides vital assistance to NASA/JPL in the development of rocket propulsion systems which will be used for future space flights.

Edwards Test Station, a remote facility of the Jet Propulsion Laboratory, is located in the northern section of Edwards Air Force Base, California. The remoteness of the facility was necessary because it was designed to test extremely noisy propulsion systems producing up to 40,000 pounds of thrust.

When you visit ETS you immediately notice things which are peculiar to a rocket test site. Special clothing and shoes are worn by some of the people involved in pouring, mixing, and curing the large solid rocket motors. Others who are handling exotic liquid rocket fuels require another kind of protective clothing.

To the outsider, other indications of the very necessary safety program quickly evidence themselves. When you enter the main gate, you relinquish all matches and lighters. You can't bring your personal car on the site. Lights on posts at the various locations on the site tell you by their color whether you can enter or not.

Above all, you are impressed with the serious attention paid to all matters of safety by all of the people working there.

And it pays off. Since Northrop assumed its responsibilities at ETS in September of 1965,

there has been no lost time due to industrial accidents.

More than 70 Northrop employees are engaged in the vital work being conducted there. They refer to themselves as "desert rats" and they are where they want to be, doing challenging work in the clean clear air of the California desert. They live in the nearby towns of Lancaster, Palmdale, Rosamond, North Edwards and Quartz Hill.

Mr. Dickinson's pleasant, efficient secretary, Alice Claiborne, should be the envy of all of our freeway fanatics. She is the wife of the stationmaster for the Atcheson, Topeka and Santa Fe terminal at Edwards, California, living within a mile of ETS.

Many of these people have been in the area for several years and have developed outside activities suitable to the desert. Bob Parker is a desert wildlife expert and the official "snake catcher" at ETS. Technician Bill Zahnle has a small ranch with cows and lambs. Rockhounds George Brothers and Bill Kramer scour the desert for interesting specimens for their lapidary collections. Stan Beard, Art Landsgaard, and Ed Blatz own light planes.

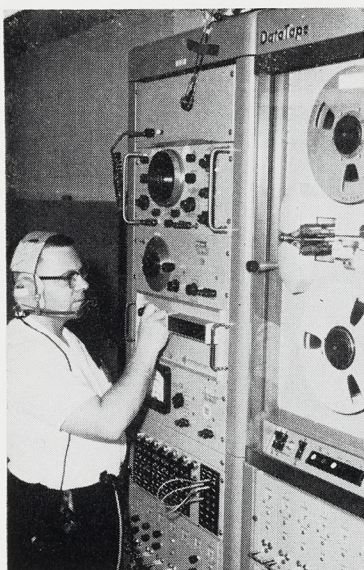
In addition to the basic tasks, Northrop-ETS supplies a vast majority of its own support. It calibrates and repairs its instruments, and provides its own on-site transportation. It stores and disburses a wide assortment of space age hardware, maintains the equipment, guards itself, keeps its own station clean and feeds (through a contractor) the people on site in a modern cafeteria. It operates its own internal communication system.

While remote, Northrop personnel at ETS avail themselves of the benefits of the NRC, and in other ways are full fledged members of the Northrop family. Discount tickets to Southland activities are especially desirable.

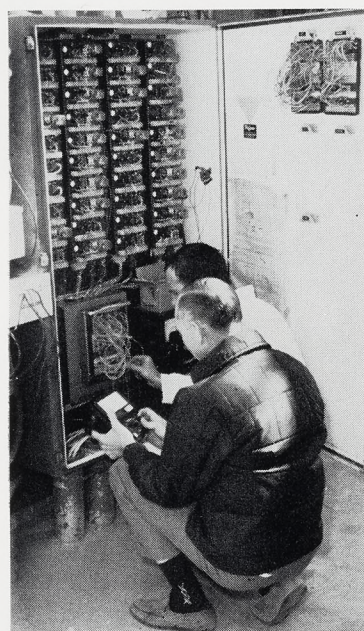
In their technical work, Northrop-ETS people

(See EDWARDS, page 5)

Photos
by
Harvey Huggins



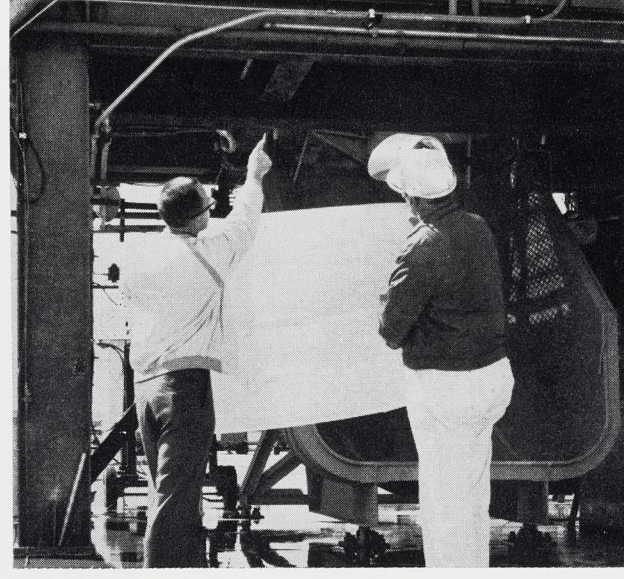
Electronic technician Max Brown (above) operates Data Tape recording unit connected to rocket test stand. After patch-in of wiring connection to another test stand (below), Jim Turner (left) and Mike Thornberry determine voltage level on lines.



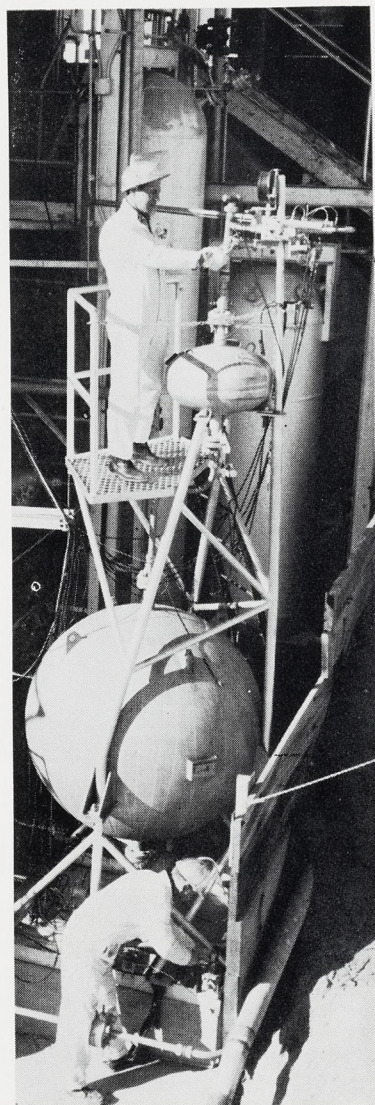
Working with automatic data recording and monitoring system console, Don DeClaire makes checkout runs of device used to record and play back digital computer data accumulated during tests.



Bill Dickinson (left) and Hank Carpenter examine ALPS injector installed on test stand. Mr. Dickinson heads the team of more than 70 NSL specialists assigned to Edwards Test Station.



Rocket engine test stands sometimes must be modified to fulfill different requirements of rocket propulsion programs. Ray Freeman (left) and Mr. Carpenter examine stand while pondering proposed changes.



Dick Decker and Neil Eckenrode hook up oxidizer lines and connect instrumentation on ALPS oxidizer calibration system.

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

For Sale

Sofa, 101" width, 2 seat cushions, 4 back cushions, contemporary decorated design, custom-made, delivered new last month, cost \$867, \$450. Bel Air, 472-2571. A

Ford, 2-dr. 1954 V8, stick shift, smog device, \$100. Anaheim, 714-776-3939. A

Walkie Talkies, 2 TMC 206 telecon 1-watt, channels 2-9, squelch control, battery meter & earphones, \$80. Gardena, 327-0461. A

Volkswagen, 1966, 1600 Fastback, just delivered from Germany, 185 miles, w/s/w tires, \$2495. Inglewood, 673-1589. A

Comptometer, 12-keyboard Felt & Tarrant, elec., \$350. Torrance, 326-6456. A

Tricycle, 12", red, \$4. Torrance, 323-8089.

Hi-Fi Speakers, Electro Voice Wolverines, LS-12 full range, MF-1 mid-range, HF-1 high freq. w/crossovers, \$35. Manhattan Bch., 374-5635. A

Record Player, Garrard, type A, \$50. Inglewood, 674-6395. A

Mattress & Box Spring, Sealy Magic Rest, full-size, \$60. Hawthorne, 675-5802. A

Rambler, 1963, Classic, 4-dr., r/h, air cond., new tires, 6 cyl., standard, seat belts, take over \$52.72 mo. pymts. approx. bal. \$892. Buena Pk., 714-521-0416. A

House, 4-bdrm., 2-story, 2250 sq. ft., fireplace, family rm., 2-bath, insulated, lge. patio, landscaped, fences, sprinklers, 1½ yr. old, all blt-ins, \$2700 dn., \$30,000. Dominguez, 632-4978. A

C. B. Radio, Olsen 717, 10 new crystals, new cond., \$75. Inglewood, OR 7-2369. A

Movie Outfit, Bell & Howell 8mm, camera w/zoom lens, projector, screen, flood lights, pistol grip, \$125. Gardena, 676-7403. A

Ketch, 20' Priviteer, day sailer, auxiliary motor, \$1200. Redondo Bch., 376-5479. A

Cooperative Apt., 2-bdrm., 8 yrs. old, 5 minutes from Hollywood race track, free washer & dryer, children OK over 16 yrs., \$3000 dn., \$126.78 mo. pymts., \$15,000. Inglewood, 678-1649. A

House, 3-bdrm., 1¼ baths, plus duplex, 2 bdrms. each on 1 lot, \$335 income, 5 min. to Norair, 10% dn., \$35,000. L.A., PL 4-1964. A

Chair, easy & reclining, \$5. L.A., 757-3595.

Console Hi-Fi, radio, phonograph, microphone, \$60. Hawthorne, 676-0418. A

Flexy Racer, sled w/wheels, \$10. P.V. Ests., 375-4742. A

Stenotype Machine & case, \$30. L.A., GR 5-3484. A

T-Bird, 1956, h/top, silver gray, fresh o/haul, paint & tires, auto. trans., orig. owner, \$1275. Pac. Palisades, 454-2057. A

Antique Bed, dble. size, beautiful scrolled ends w/side rails, \$35. Torrance, 371-2706.

Refrigerator, Coldspot, 13 cu. ft. w/sep. freezer, \$75. Cypress, 714-828-9142. A

Sloop, 20' cabio cruising-type, \$2250. Inglewood, OR 7-5142. A

Ford Falcon, 1960, r/h, new seat covers, \$300. Santa Monica, EX 3-5983. A

Honda, 50cc, C102, new, elec. starter, windshield, mirrors, \$200. Inglewood, 754-3946.

Motor Scooter, 1963 Allstate compact, needs eng. work, \$50 or sell for parts. Inglewood, 676-8982. A

Oldsmobile 88, 1955 4-dr. Holiday sedan, radio, p/s, p/b, auto. trans., good tires, needs rings, \$150. P.V. Pen., 377-5907. A

Oldsmobile, 1956 h/top, \$175. Torrance, FR 5-0908. A

House, 3-bdrm., 1½ baths, fireplace, in Torrance, 10% dn., \$23,900. Redondo Bch., FR 9-9786. A

Surfboard, Bragg, 8'11" long, wgt. 22½ lbs., 3½" thick, clear deck, custom finish, \$65. Hermosa Bch., 372-6755. A

Rifle, .22 cal Winchester, semi-auto., model 902, w/near new, delux, gun case, \$40. Torrance, 375-7817. A

Photographic Darkroom Equipment, inclis. 2¼ x 3¼, enlarger w/f4.5 lens, printer, spotometer, timer, cut film tank, roll film tanks, montage masks, 3 sets of trays, \$145. Miraleste, 831-5615. A

Stove, Gaffers & Sattler, 30", 4 burners, grill, broiler, oven window & light, \$75. La Palma, 827-2117. A

Saddle, 15½" seat, handcrafted silver-mounted, needs repair, \$900. Box 1101. A

House, 3-bdrm., family rm., used brick fireplace, lge. covered patio, extra lge. liv. rm. & master bdrm., 2-bath, near Knotts Berry Farm, \$22,900. Buena Pk., 828-3237. A

Boat, 13', w/Johnson controls, trailer, no motor, \$295. P.V. Ests., 378-3055. A

French Poodle, miniature, female, AKC reg., \$50. Redondo, 535-8214. A

Clarinet, La Sete E-Flat, Boehn sys., w/carrying case, \$50. Torrance, 371-1726. A

Manual, MG Workshop, new 1964 ed., Scientific Pub. Sidney, covers series TC, TD, TF1500, MGA, & MGA 1600, \$4.50. Torrance, 328-5655. A

Washer, G.E. Filter Flow, \$25. Hermosa Bch., FR 4-8036. A

Pickup Truck, 1958 ½-ton, r/h, \$700. 324-7442. A

House, 3-bdrm., family rm., all bltin kitchen, breakfast bar, 1¼ pullman bath, fireplace, dble, attach. gar., 70 x 115 lot, lge. patio, in Corona, \$18,500. Fullerton, 526-6118. A

For Sale

MGB, 1965, r/h, h/top, \$2395; w/out h/top, \$2295. La Habra, 691-9534. A

Dishwasher, portable, 6 mos. old, GE deluxe Mobile Maid, cost \$218; \$110. Huntington Bch., 714-847-2269. A

Honda, 1965 305cc Scrambler, less than 2000 miles, hvy. duty equip., \$600. Box 1102. A

Mustang, 1965, 6-cyl., stick shift, r/h, w/s/w, \$1895. Gardena, 673-1097. A

Horse Ranch or 2-cabin sites, 5-acre, in Willow Springs area, \$1750. Rolling Hills Ests., 325-3057. A

Horse, 5-yr.-old gelding, gentle w/children, \$275. Box 1103. A

Mustang GT 2 + 2, 1965, 4-spd. trans., 4-bbl. 289 cu. in. 225 hp eng., 5 Style Steel wheels, low mileage, many extras, 1 yr. warranty left, \$2595. Redondo Bch., 376-8285. A

Pontiac Catalina, 1960 convt., new top, brakes & battery, \$795. Box 1104. A

Comet, 1960, station wagon, std. shift, \$450. Santa Ana, 531-0245. A

Refrigerator, Frigidaire, crosstop freezer, \$30. Fullerton, 526-2962. A

Surfboard, \$55. Redondo Bch., FR 5-0061. A

Desk, knee-hole type; corner piece & chest of drawers, has 9 drwrs., cherry teak finish, modern, \$45. Anaheim, 638-8985. A

Dinette Set, round, walnut Formica table w/2 leaves, 4 ivory vinyl chairs, 1-yr.-old, \$50. Long Bch., 596-9748. A

Adding Machine, Olivetti, manual, 1-yr.-old, cost \$115, \$55. Torrance, FR 5-2929. A

Chevrolet, 1956, 2-dr. spt. cpe., r/h, p/s, V-8, stick shift, mag. rims, new tires & paint, \$650. Hawthorne, OS 9-2122. A

Ford Fairlane, 1959, r/h, \$275. Redondo Bch., FR 0-4643. A

House, 3-bdrm., 1-½ baths, sliding glass door to covered patio, fireplace, outside laundry rm., 3 blocks to Del Amo shopping center, dble. attach. gar., \$29,500. Torrance, 375-9459. A

House, 3-bdrm., bltins, birch cabinets, bltin TV/Hi-Fi area, raised fireplace, 500 sq. ft. playroom-workshop, 2½ car gar., fruit trees, walking dist. to shops, 20% dn., \$27,250. Alhambra, AT 4-5698. A

Engagement Ring Set, interlocking, \$180. other jewelry avail. at very reasonable prices. Hawthorne, OS 9-4723. A

Stauffer Table, w/attachments, cost \$350; \$75. Santa Susana, 805-527-1590. A

Air Conditioner, room-type, 1 hp, 220 V., 3 phase, \$30. Torrance, 371-1830. A

Chevrolet, 1958 station wagon, V-8, p/s, Premium w/s/w, \$695. Manhattan Bch., FR 2-2759. A

Outboard Motors, 25 hp Evinrude, 7½ hp Fishing Scott, \$185. Gardena, DA 4-8853. A

Stove, elec., 2-burner-type, \$7.50. L.A., 472-3374. A

Camera, 35mm, Canon IV-S2, 50mm f1.8 & 135 mm f3.5 lens, univ. viewer, carrying cases, filters, \$200. Huntington Bch., 842-2649. A

Mustang, 1965, 289 4 bar., 4-spd., chrome rev. rims, \$2300. Cypress, 827-7189. A

Lamp, pull down-type, wall mounting, never used, \$4. Hawthorne, 676-0758. A

Tape Recorder, Sony, stereo, 2-track, model 522, \$65. Torrance, 375-6467. A

Chevrolet, 1965 Impala Super Sport, p/s, p/b, Powerglide, w/s/w, 13,000 miles, r/h, \$2300. Torrance, 376-8515. A

Refrigerator, 13 cu. ft., Norge, freezer compartment, late model, \$40. L.A., 766-2809. A

Stove, Universal, gas, 4-burner, 36", oven & broiler, \$50. P.V. Ests., 377-8572. A

Range, lge. deluxe G.E. elec., \$65. Inglewood, 674-5445. A

Mobile Home, 1-bdrm., Fleetwood 10' x 42', late 1962, carpeted, G.E. refrig., light wood paneling, \$3000. Torrance, 327-9003. A

Studebaker, 1957, V-8 station wagon, \$150. Hawthorne, 679-6581. A

Dishwasher, portable, Kitchen Aid, white, never used, \$200. Manhattan Bch., 788-7519. A

Ford Fairlane, 1958, convt., new tires, seat covers, police interceptor eng., many extras, \$230. Burbank, 845-9819. A

Cornet, Olds, \$40. Torrance, FA 8-5931. A

Ford, 1954, V-8 auto., good tires, 4 dr. sedan, r/h, \$125. Gardena, DA 4-0649. A

Accordion, 120-bass, \$100. Torrance, 379-7165. A

Surfboard, 9'4" Rick, 5 redwood sticks, cost \$145; \$90. Lynwood, 635-2666. A

Volkswagen, 1960, good eng., needs paint & bumpers, \$300. Wilmington, 835-9070. A

Evaporator Cooler, Coronado, 1/6 hp motor, pump, float & all plumbing, 5200 cu. ft., min. airflow 17 x 24 x 30, window-type mount, cost \$130; \$75. Hawthorne, OS 9-8644. A

Ford, 1948 coupe, 1963 Chev. 283 eng., new int., vibrasonic radio, orig. paint, over \$1550 invested, \$1100. Torrance, FR 8-1350. A

Ford, 1957 V-8, auto. trans., \$350. Hawthorne, 644-3501. A

Hi-Fi Equipment, Garrard 98 changer, Harman-Kardon amplifier, R-J enclosure, Jim Lancing extended range speaker, Garrard stylus pressure gauge, plus 8 assorted LP records, \$39. Box 1106. A

For Sale

Ford Galaxie 500, 1965, tudor h/top, V-8, p/s, r/h, factory air, less than 15,000 miles, \$2495. Long Bch., GA 3-1363. A

Thunderbird, 1961, low mileage, p/s, p/b, r/h, \$1350. Torrance, DA 3-2144. A

Home, 3-bdrm., family rm., fireplace, bltins, dble. gar., fenced yard, patio, extras, \$26,500. Lomita, 326-3135. A

Plymouth, 1957, 2-dr. sedan, 8-cyl., auto., orig. owner, 70,000 miles, \$175. Torrance, 326-1867. A

Coin Collection, over 300 U.S. & foreign, \$100. Box 1105. A

Sailboat, 8' Pram, \$175. Torrance, 324-3226. A

Spinning Wheel, antique New England, hand-carved in New Sweden, Maine in mid-1700's, \$65. Inglewood, 672-7424. A

Stereo Tape Deck, Lafayette RK-140 w/2 mikes, \$65. L.A., 472-2031. A

Den Furniture, Early American maple, couch, chair, end tables, coffee table, \$40. P.V. Ests., FR 7-4674. A

Fireplace Screen, accessories & andirons, never used, \$15. Torrance, 370-2347. A

Truck, Chevrolet, 1956, V-8, 4-spd. Hydro, good tires, camper shell, r/h, new paint, step bumper, \$650. Torrance, DA 9-7994. A

Bedroom Set, twin, mirrored vanity, night stand & chest of drwrs., semi-modern, no mattresses or box springs, \$40. Torrance, DA 6-5558. A

Home, 3-bdrm., family rm., breakfast bar, 2 baths, bltins, patio, fenced yard, 4 yrs. old, near high school, Sun Ray, G.I. resale, \$750. dn. \$22,750. Wilmington, 375-8778. A

House, 2-bdrm., full dining room, breakfast rm., fireplace, dble. garage, \$20,950. Inglewood, OR 1-3860. A

Dog House, \$10. Hawthorne, 675-9389. A

Home, 3-bdrm., paneled den, lge. all-elec. kitchen, patio, block wall fencing, 4¾% loan, or refinance, \$21,750. La Mirada, 944-1734. A

Pups, Weimaraner, 4 males, 5 females, AKC reg., avail. June 24, \$100. Rolling Hills, 377-1281. A

Camera, 4 x 5 Speed Graphic, w/Polaroid & roll film backs, 15 holders, 2 flash guns, 135 mm Optar lens, hard case, extras, \$200. Orange, 714-637-5855. A

Home, 3-bdrm. & den, near fwy. & schools, patio, fenced yd., plenty of storage, \$21,900. Gardena, DA 9-2904. A

Chevrolet, 1962, Impala, 327 eng., auto., p/s, deluxe r/h, \$1300. Norwalk, 864-9532. A

Panel Truck, 1955 Chevrolet, 6-cyl., stick shift, \$125. Box 1107. A

House, 3-bdrm., family rm., 2 baths, lge. landscaped yd., bltins, fireplace, patio, dble. gar., close to schools, 5¼% loan or terms, \$24,500. Anaheim, 827-4501. A

Evaporator Cooler, auto-type, 12-volt, 2-spd. fan, used once, \$20. Torrance, DA 6-5566. A

Custom Bumper Hitch for 1960-'65 Rambler, \$10. Torrance, FR 1-5072. A

Television, 17" Packard Bell, blonde oak, small console, antenna & spare tubes, \$25. Torrance, DA 3-8797. A

Wanted to Buy

Copying Machine, must make copies inexpensively & handle 8½" x 11" copy, make permanent copies, ThermoFax-type not desirable, will pay up to \$100. Lakewood, ME 3-6346. A

Generator, audio signal, EICO mod. 377 or equivalent. Whittier, OX 3-4117. B

FREE (To Be Given Away)

Kittens, 6 wks. old, yellow, black, white, box trained & weaned. Hawthorne, 645-7762. A

Dog, white German shepherd, 4 yrs. old, likes children. Gardena, OS 6-4261. D

Kitten, male, 6 wks. old, multicolored, frisky w/much personality. Torrance, DA 4-8372. D

Rentals Offered

Apt., 2-bdrm., unfurn., disposal, carport, h/wood floors, 9 miles to Norair, 1 child OK, \$90. Lynwood, 635-3784. E

Apt., 3-bdrm., 2 baths, family rm., fireplace, pvt. patio, bltin units, intercom, dishwasher, F.A. heat, hot water & trash pd., near Norair, \$175. Hawthorne, 679-1358. E

Apt., 2-bdrm., unfurn., garage, \$105. Redondo Bch., FR 2-5310. E

Bachelor Apt., furn., utilities inc., \$45 mo. L.A., PL 4-9866. E

Home, 3-bdrm., 2 bath, on 1 acre lot, 5 yrs. old, family room, bltins, recently redecorated, avail. July 1, \$165 mo. Thousand Oaks, 805-495-5128, 805-495-2023. E

Apt., unfurn., 2-bdrm., 2-bath, pvt. balcony, air cond., playyard, underground parking, \$152 mo. Inglewood. FR 5-0867. E

Cabin, Green Valley Lake, make vac. reservations now, \$35 weekend; \$60 wk. Torrance, 320-2002. E

Apt., 1-bdrm., pool, deluxe, \$95 mo. Redondo Bch., 376-2117. E

Apt., 2-bdrm., garage, 10 mins. to Norair, \$95 mo. Redondo Bch., 370-9541. E

Apt., 1-bdrm., deluxe, furn., pvt. patio, 3 mins. to Northrop, \$100 mo. Inglewood, 756-7389. E

Apt., bachelor, furn., util. pd. & 1 bdrm., furn., gar., 1 block from beach near Marina, \$80 & \$110. San Pedro, 831-6789. E

Apt., 1-bdrm., unfurn., enc. tub & pullman, redeec., 1 child OK, no pets, water & trash pd., \$80 mo. Hawthorne, OS 5-8335. E

Apt., duplex, 1-bdrm., unfurn., w/gar., single, \$65; cple. \$75. Inglewood, PL 3-0884. E

Duplex, 2-bdrm., unfurn. bltins, child OK, fenced yard, near Northrop, \$125 mo. Hawthorne, OS 9-6334. E

Apt., 3-bdrm., garbage disp., closed gar., water & trash pd., no pets, 10 minutes from Northrop, \$125 mo. Redondo Bch., 370-7550, OS 6-3333. E

Vacation Cabins, Lake Gregory & Crestline, make reservations early for June thru Sept., \$25 weekends, \$60 wk. Venice, EX 1-2040. E

Apt., unfurn., 1-bdrm., near Northrop, laundry room, all elec. bltin range, car port, \$95. Hawthorne, 675-2075. E

Apt., 1-bdrm., furn., 1 block from Northrop, bltins, forced air heat, adults only, \$110. Hawthorne, OS 6-5425. E

Rentals Offered

House, 3-bdrm., completely furn., garbage disp., dble. gar., rent for 3-6 mos. or longer, within walking distance of Northrop, \$250 mo. Gardena, 324-0730. E

Rentals Wanted

Apt., 1-bdrm., furn., for 3 summer months, near plant or El Camino. Rolling Hills, 831-9707. F

Lost

Lost at NSL, blue, 3-ring notebook w/UCLA class notes plus text book Real Estate Property Management. Beverly Hills, CR 6-3534. L

Personals

A heartfelt thank you to all my many friends at Norair for their sympathy & expressions of kindness during my recent time of sorrow. MRS. DEWEY MYERS. L

Flight Safety engineer wants to exchange maintenance work on light aircraft for flight time. F.A.A. licensed A & P mechanic. Hawthorne, 644-2592. L

Free Lance photographer wanted to take wedding pictures in August. Torrance, 375-2018. L

I wish to thank all the wonderful people at Norair, particularly Orgn. 8800, who were so thoughtful in remembering me with flowers, cards & good wishes during my recent illness. CLAIRE PAYNE. L

Share Driving & expenses to Pittsburgh, Penn., leaving on or around June 24, return by July 18. Inglewood, 677-5705. L

For Sale or Trade

Pickup, Chevrolet, 1966 ½-ton, custom cab, Powerglide, 283 cu. in. V-8 eng., low mileage, \$2790 or trade 1960-'61 auto for \$600 equity & assume \$87.94 mo. pymts. L.A., 589-8682. M

Projector, Bell & Howell, \$100 or trade for bedroom furniture. Inglewood, 672-4486. M

Going my way?

Rides Wanted

7 a.m. — 3:45 p.m.

Avalon Blvd. at San Diego Frwy., L.A. B. Slack, Norair, ext. 2605, 632-7661. 2

7:30 a.m. — 4:15 p.m.

Vermont & 184th St., Gardena. Joan Adamo, Norair, ext. 1316, DA 9-1526. 3

8 a.m. — 4:45 p.m.

Highland & 33rd St., Manhattan Beach. Two girls want ride. Ymelda Fettig, Nortronics, ext. 403, FR 2-4947. 5

Orange Ave. & Del Amo, Long Beach. W. H. Covert, NSL, ext. 2721, GA 3-1363. 5

Irvine & 17th St., Newport Beach. Interested in starting 2-man car pool from Costa Mesa Newport area. E. K. Reese, Norair, ext. 1815, 646-1387. 5

Manhattan Beach Blvd. & Prairie Ave., Lawndale. Eleanor F. Maisano, Norair, ext. 2123, 370-3365. 5

Rides Offered

8 a.m. — 4:45 p.m.

Orange Ave. & Del Amo, Long Beach. W. H. Covert, NSL, ext. 2721, GA 3-1363. 15

Irvine & 17th St., Newport Beach. Interested in starting 2-man car pool from Costa Mesa Newport area. E. K. Reese, Norair, ext. 1815, 646-1387. 15

EDWARDS TEST STATION

(Continued from page 4)

ple work side-by-side with a score of JPL engineers and scientists on the several programs in progress at any one time.

The solid and liquid rocket developments performed at ETS include fabrication, assembly, environmental test and test firing of rocket components.

Northrop people prepare both solid propellant rockets and liquid fuel engines for the various environmental tests required to verify that the propulsion systems will operate properly during their flight missions.

Live test firings on the seven centrally controlled test stands at ETS are a major part of these programs. Static firing operations are conducted with the motors bolted to the test stands.

Development and qualification testing, both of engineering prototypes and of production motors exactly like those which will operate on spacecraft, provide data on the effect of various environments on the rockets.

The following factors determined by development testing are used by JPL to evaluate the ability of the propulsion system to function properly:

Operation under the vibration and temperature extremes of the actual mission;

Stresses imposed by "G" loading, radiation environment, and the vacuum of space; Shocks caused by transportation in trucks over rough roads during either hot or cold temperature extremes;

Heating from the combustion of the motor itself.

Northrop-ETS has both a next-door neighbor and a down-the-street neighbor in the Northrop family. Next door is Northrop's Flight Test facility at Edwards Air Force Base. Neighbors being what they are, technicians are loaned to ETS by EAFB to accommodate peak workloads. "Down-the-street" is Northrop-Palmdale with additional help if and when needed.

Mr. Dickinson, Northrop-ETS's project manager, is proud of the people and the work they do.

"Both the experience and intelligence level of our people handling every job is well above average," he reported. "This has a lot to do with the success of our programs and our excellent safety record."

Though proud of its safety record, the organization is prepared to cope with emergencies. A trained volunteer rescue crew stands ready to man a specially prepared truck containing equipment to meet industrial or medical emergencies. These men are well prepared to help their fellow worker.

Northrop is thus contributing to our space efforts in yet another area, the development of rocket propulsion systems. Northrop-ETS is a valued member of the family of remote support projects being developed under Louis Brennwald and the Northrop Support Operations department.

\$200 Offered For Referring Engineers

A \$200 award will be paid to Northrop Ventura employees who refer a weights engineer, stress engineer or airframe design engineer to Northrop.

That's the announcement made recently by D. D. Archer, chief of the Personnel group at Northrop Ventura.

Any applicant referred under the plan must be employed by Northrop Ventura on a full-time basis and must remain on the payroll at least 90 days.

Also, an award of \$100 will be paid to employees who successfully refer a designer to the company.

The referred applicant, Mr. Archer said, must present a Referral Award Card (Form 50-181) at the time of first contact with the Industrial Relations organization.

The cards are available in Room A118.

All employees are eligible to receive the awards, Mr. Archer said, except personnel who regularly work in employment recruiting, corporate and division officers, supervisors of the applicant being employed, department managers, section directors and group chiefs.

APOLLO

(Continued from page 1)

comparative advantages of side- and bottom-opening concepts," Robert Boulanger, project engineer (Design), said.

"Based upon preliminary packing and rigging tests, we've decided to go ahead with the side-opening concept, which has proven superior to the other."

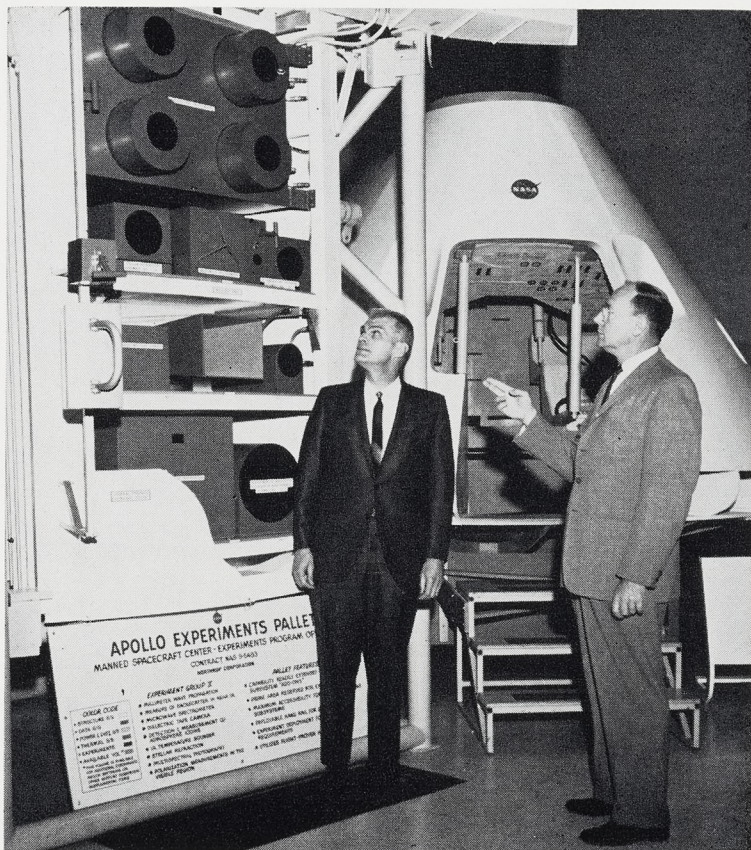
The "integral" designation means that, rather than using a separate system, the retention system is in part integral with the main chute deployment bag. It will be released by the pilot chute riser upon its deployment.

Installation of equipment will continue through August 12, Mr. Florence said.

After that, the B/P will be taken to El Centro for drop testing, scheduled to start during the week of October 17.

Tests are tentatively scheduled to be completed by next February 13.

APOLLO PALLET DESIGN



Portion of mockup of Apollo experiments pallet designed by Northrop Space Laboratories is backdrop for this discussion between George Muinch (left), manager of the program, and Robert Cooper, a 25-year Northrop veteran, who was responsible for manufacturing and procurement. Northrop is one of four companies awarded NASA contracts to perform four-month pallet design studies.

GRAPHICS: Film Archives Hold 44,000 Stills, 2 Million Movie Feet

(Continued from page 1)

and makes it easier to pinpoint how well the flap responds to commands.

The precise requirements of the Apollo program has led to development of a camera tracking mount for ground use by Robert Thornton, a member of the section.

Simply called a "cluge" by its inventor, the device permits one man to operate four cameras simultaneously with fingertip control, whereas it used to be a back-breaking effort to handle one camera.

This was because of the camera weight (including six-foot-long lens) and the fact that shooting was straight up. Quality of photos is much better now too, since the device keeps the cameras more steady than before.

If you ask a member of the Apollo program technical staff

what he likes best about Arts and Graphics contribution, chances are the first thing you will hear about is the service.

"We're probably spoiled beyond repair," says one engineer. "Each time we had an afternoon drop test at El Centro, the films were back at El Centro the following morning at 8 a.m. for viewing."

Good equipment and good people are the keys to success, according to Mr. Martin.

"We are extremely fortunate in these respects, especially the latter," he said.

All of the staff—Arper Stire, Howard Kaish, Bruce Dyke, Gil Nunn, Tom Smalley, Bob Thornton, and Harvey Bergman—can fill at least three or four jobs.

"There is no room for trainees here," Mr. Martin says. "Typically, a staffer has a degree in photography and considerable experience."

Friesen, Bartz Receive 20-Year Service Pins

Ralph Friesen and Harry Bartz of Northrop Ventura have received 20-year pins for service to the company from George Douglas, Corporate vice president and Division general manager.

At the same time, eight Northrop Ventura employees became eligible last month for 15-year pins; eight for 10-year pins; and two for five-year pins.

Mr. Friesen is project manager of the RP-76 and RP-78 Target Systems in the Target and Tactical Systems section. He has responsibilities for the management and performance of the project, including coordination for establishing support requirements, quality, schedule and cost aspects.

From 1941 until 1958—except for a brief time out in 1945 and 1946—Mr. Friesen was with the Norair Division, serving as supervisor of maintenance, assistant base administrator and as base administrator for rocket and aircraft flight tests at Holloman Air Force Base.

He has been with Northrop continuously since May 1946.

Mr. Bartz, now a developmental mechanic at Northrop Ventura's Assembly and Installation department, also joined the company in May 1946.

At first, he was a sheet metal worker, but progressed along the line to experimental mechanic, surface area mechanic, leadman, and foreman, from 1950 to 1961.

Receiving 15-year pins in May were George Carman, James Covington, Estella Johnson, Fred Poczek, Joseph Pulver, William Wabnitz, Isabella Willson and Gladys Young.

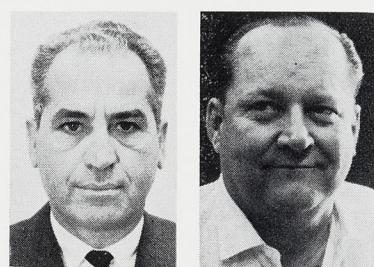
Ten-year pins went to Robert Baltz, Richard Bargman, Everet Brunson, Dan Cashier, Lawrence Dellarto, Joseph Glowacki, James Powell and Darrell Welch.

DRONES

(Continued from page 1)

The plaque was signed by Major General Chou Kai, chief of the Republic's Army Ordnance Service.

Pacific Target Operations includes activities at Okinawa and Hawaii in addition to Taiwan and Korea. This is the sixth year the Division has provided the annual services.



Mr. Friesen

Mr. Bartz

Nortronics Wins Battlefield Data System Contract

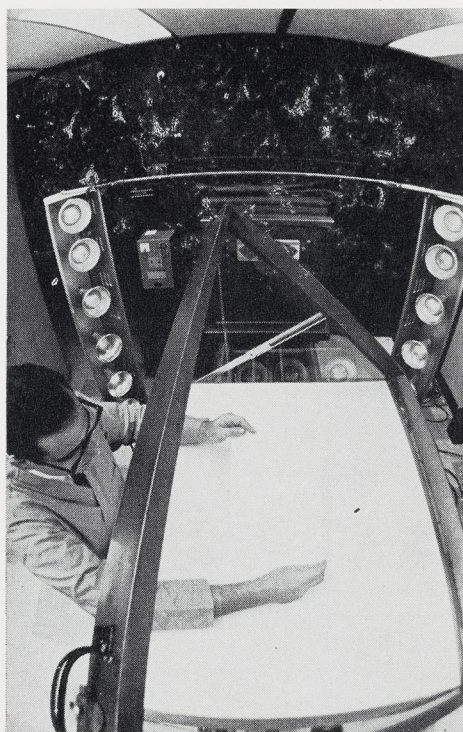
Northrop Nortronics has received a \$4.1 million contract to help the armed services develop a system to provide military commanders faster and better battlefield information.

Northrop will provide systems engineering and technical direction for a new joint service program known as TIPI (Tactical Information Processing and Interpretation). The TIPI program is a joint effort of all U.S. military services to develop field intelligence processing units required to keep pace with modern aerial and surface reconnaissance equipment.

The high speed information processing centers, contained in mobile units, will be available for rapid transport to any location in the world in response to tactical warfare requirements, ranging from operations such as those in Vietnam to major conflicts.

Scope of the program, which is under the direction of the TIPI Joint Service Program Office at Wright-Patterson Air Force Base, Ohio, encompassed design, development and acquisition of facilities. Northrop will participate in all phases of the program. Northrop's work will be performed at Anaheim.

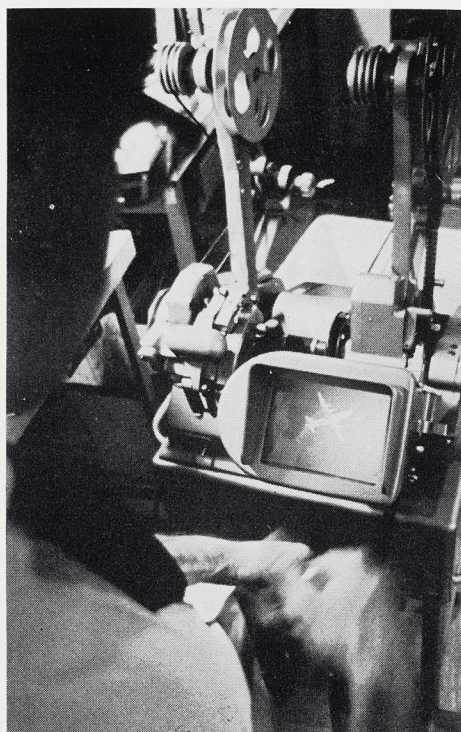
Numerous firms are expected to participate in the TIPI program because of the wide range of technologies required by the mobile intelligence facilities. Included are photo processing, photographic reproduction, electro-optics, electronics, data processing and information displays.



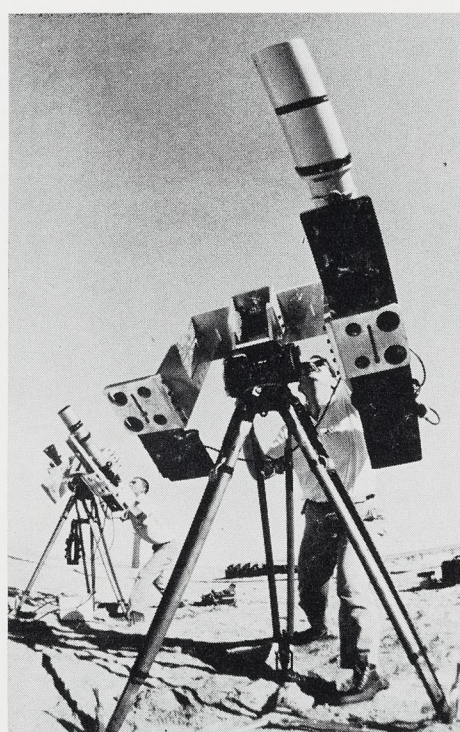
Eerie effect of ultra-wide angle lens gives circular appearance to rectangular equipment in graphics lab. Howard Kaish is readying a document for photographing.



Camera crew members (from left) Arper Stire, Tom Smalley and Gil Nunn relax after filming introduction to Apollo documentary movie by Northrop Ventura General Manager George Douglas.



Magnified frame of movie film is enlarged to show DC-7 transport as film passes through editing machine. Aircraft is used to drop Apollo boilerplate vehicles in tests at El Centro.



Filming drop test in desert near El Centro are Bob Thornton (foreground) with still camera and Gil Nunn with battery of movie cameras. Camera mount was designed by Mr. Thornton.

NORTHROP NEWS

NORTHROP VENTURA

Published biweekly by Northrop Corporation, Beverly Hills, California

Vol. 24, No. 12

June 22, 1966

Big Screen Debut for GT Ringsail

SPECIAL TO THE NORTHROP NEWS

"If a Gemini landing gets any closer than this one, we'll have to back off the carrier."

This smiling comment by Air Force Lt. General Leighton I. Davis described in capsule form the extraordinary accuracy with which the Gemini 9 crew brought down their spacecraft to an Atlantic Ocean landing on June 6.

General Davis is Defense Department manager of Manned Space Flight Support Operations which includes the Naval recovery forces which were on the right spot at the right time for the record-breaking recovery of Astronauts Thomas P. Stafford and Eugene A. Cernan.

For the first time since beginning of the two-man Gemini flight program early in 1965, the landing accuracy was such that the Northrop Ventura main parachute landing system was clearly visible from the deck of the recovery carrier, the U.S.S. Wasp. With TV communications relayed by way of the Early Bird satellite, the 84-foot orange and white parachute with the spacecraft in tow also was visible to millions of television viewers in the Western Hemisphere.

Although the Gemini 9 spacecraft actually overshot its aiming point by some three miles, a quirk of the weather erased half of that landing error. After the main chute had deployed at about 9600 feet, an easterly breeze drifted it back toward the aircraft carrier.

Dr. George Mueller, associate administrator of the NASA Office of Manned Space Flight, termed the accuracy of re-entry and landing as one of the two greatest accomplishments in the Gemini 9 flight. The other major accomplishment, he said during a post-flight news conference, was the fact that Stafford and Cernan successfully tried three different techniques of rendezvous with another object in space.

The suspense, which built up during the communications blackout of re-entry, was broken about 5½ minutes before scheduled splashdown when the Wasp reported radar contact with the spacecraft at 50,000 feet. Moments later, Stafford reported to

(See GEMINI, page 6)

Artists' Talents Featured In Unique Slide Show

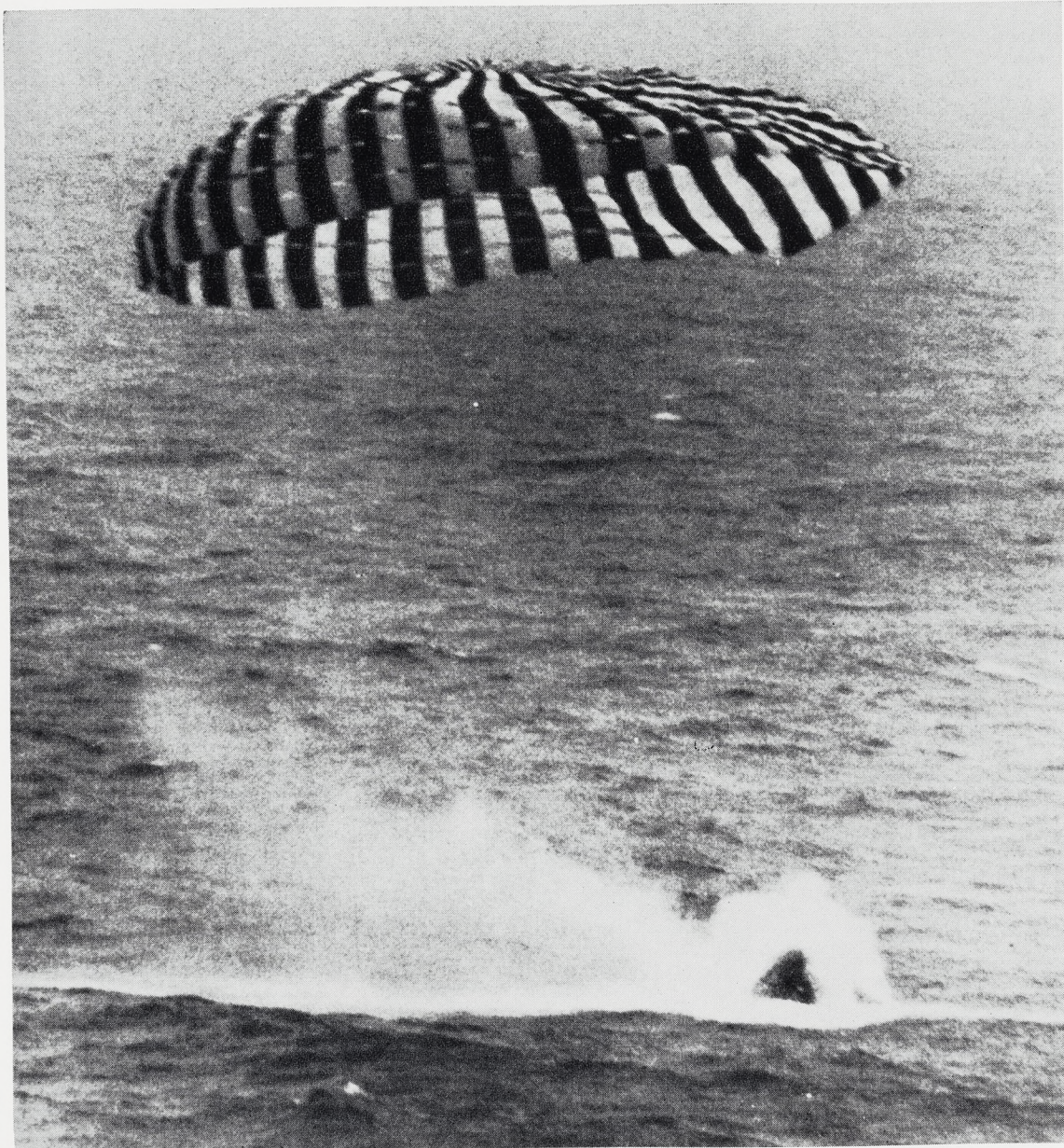
A unique art show—all on color and black-and-white slides—will be presented next week to employees at Northrop Ventura.

The 30-minute show, the work of the Arts and Graphics branch,

(See photos on page 6)

will be shown continuously from 11:20 a.m. to 1 p.m., June 29, in the Administration building assembly room.

Curly Martin, Arts and Graphics supervisor, is directing preparation of the show.



NASA photographer records impact of Gemini 9 spacecraft as it descends by parachute into the Atlantic Ocean, 345 miles east of Cape Kennedy June 6. This marked the first time that a photographic record had been made of an

American spacecraft splashdown. All spacecraft landings to date (Mercury, Gemini, Apollo) have used the Northrop Ventura Ringsail parachute.

WITH TWO TONS OF MARLIN

Playing 'Tag' for U.S. Game Agency

Northrop Ventura welder Ted Hildebrand has a fish story that is a unique variation on the "one that got away." It concerns the ones he throws away every summer as a participant in a U.S. Fish and Game Commission program to chart the migratory habits of big game fish.

Marlin, sailfish, albacore, and tuna are of primary interest to the government agency, and last March Mr. Hildebrand personally landed more than two tons of the big ones in nine days of patrolling the southern tip of Baja California.

"There is all the excitement, drama and satisfaction of sport fishing in what we do. You hook them, you fight them anywhere from 15 minutes to 3½ hours each, you pull them up to the side of the boat, then you tag them and let them go," he explained.

For six consecutive summers now, Mr. Hildebrand has been a member of a Southern California party which fishes near the village of San Lucas in a 57-foot cruiser, The Dorsal, owned by Elmer Hehr of Newport.

The best year has seen nine men tag 180 fish in nine days. This year Mr. Hildebrand alone landed 30 marlin and one sailfish.

Tags are filled out as to date, location, approximate weight of the fish and other pertinent information. They are placed in a hollow tube and, in a split second operation, are hooked to the fish near their dorsal fin.

A duplicate tag is mailed to the U.S. agency. There are blanks left on the tag attached to the fish for some future angler to complete when he makes a catch. Instructions are included which hopefully will lead to this tag also being mailed to the Commission.

All that remains for the Com-

mission to do is compare the tags to gain a little more valuable information on habits of earth's aquatic inhabitants.

Although Mr. Hildebrand has never caught a fish with one of his own tags on it, he recently learned that some he did tag off Baja were landed near Catalina Island, 25 miles out of the Los Angeles Harbor.

Mr. Hildebrand, who has worked for Northrop Ventura for 21 years, participates strictly for the excitement and has few trophies for his labor.



Mr. Hildebrand

Guardsmen Open Season On Drones

More than half the distance to the moon—130,000 miles, to be exact.

That's how far members of the Northrop Ventura Technical Services branch have traveled this year in providing technical support and training to U.S. armed forces.

They have covered that distance in 30 different trips, servicing 12 National Guard units.

Most of their services are for Army National Guard units which operate MQM-33 targets—formerly called OQ-19—for anti-aircraft training.

This training is spread out through the year; during winter months on weekends, and during the summer months each National Guard unit trains at a major military range for a two-week period.

Fort Stewart, Georgia, will be host to National Guard units from Florida, Alabama and South Carolina. Technical Service representatives will be Marsh Loane, Wayne Beck, Jerry Koopman and Herb Miller.

Lou Raiola and Mr. Beck recently completed a 10-day instructional period at Courtland Air Force Base for the Alabama unit to better prepare the unit for summer encampment. Mr. Raiola demonstrated precision flying with the MQM-33 for Armed Forces Day as part of the program.

Jack Bean will be with the Virginia Army National Guard at Virginia Beach, while further north, Mr. Loane will have the Pennsylvania Army National Guard at Bethany Beach, Delaware. In the midwest, the Ohio Army National Guard will have the services of Mr. Miller.

Jack Smith, the permanent representative at El Paso, will take care of New Mexico and at Fort Bliss, the Regular Army.

On the west coast Mr. Raiola will be at Seaside, Oregon, with the Oregon and Nevada National Guard units.

Glenn S. Livingston, branch supervisor, said in addition to

(See TRAINING, page 6)

4000 Combat Hours Logged by Fighters

Northrop-built F-5 tactical fighters, flown by the Air Force's 10th Fighter Command Squadron, late last month racked up their 4000th combat hour in Vietnam.

A review of the 4000 combat hours shows the F-5's have flown more than 3500 air strike sorties in both North and South Vietnam. On these strikes, 10,000 bombs of various sizes were delivered, 5000 2.74-inch rockets were launched and a half-million 20mm cannon shells expended.

The F-5 pilots have been credited with a possible kill of about 435 Viet Cong, destroying 11

(See VIETNAM, page 6)

CLUB NUCLEUS MEETS

Enthusied Retirees Map Plans

A nucleus of Northrop Corporation retired personnel gathered at NRC Clubhouse, Hawthorne, June 12 to begin planning a full slate of activities for retirees and their spouses.

This initial get-together was open to all retirees with more than 50 turning out from among several hundred who have indicated an interest in a retiree organization. Combined NRC Councils from all Northrop divisions have participated in the preliminary efforts in creating this organization which will be operated by and for retirees hereafter.

A major order of business was the selection of steering committees to plan for future activities. And those attending elected to hold a second meeting from 12:30 to 2:30 p.m. Monday, July 11, NRC Clubhouse, Hawthorne. All retired personnel and their spouses are invited to attend and help get the new group started.

Named to important committee posts were: Nominating committee, Norbert Lorentz, Walt Brophy and John Merritt; Clubhouse committee, Molly Fay, J. R. Lindley and Jeannette Kaupp; Reunion committee, Rene Rotte, Margaret Bruchy and C. C. McLean; and Newsletter committee, Norbert Lorentz, Jeannette Kaup and Walt Brophy. All committees have staged meetings since the initial get-together.

Especially needed at this time are additional volunteers from among the retired personnel ranks to help carry out specific organizational assignments. Those interested may drop a note to Norair Personnel Activities office indicating their scope of interest and when they will be available to help.

Seven lucky participants in the initial meeting received door prizes. Lou Combs and Jack Fleming received special prizes as the oldest retirees in attendance. Each is 81 years young. Others winning prizes were M. E. Mills, B. V. Morley, Alvera Hayes, Jack Dyer and Charles Kant.



REMEMBER THE FIRST ONE?—Talon model, one of several door prizes, interests Northrop retirees at recent get-together. Event drew over 50 retirees who started planning and work toward creation of a retired employees' organization. Next meeting, open to all retirees, is at 12:30 p.m., July 11.

Vacations and Accidents: The Cycle Begins Again

Vacation time is here again and hundreds of Northrop families will soon forget work for a time and embark on ventures of their own choosing—travel, camping, fishing, boating, visits or just plain relaxing.

For the majority it will be a happy time. For a few the dark shadow of accidents will mar festivities.

The men who guide major Northrop safety programs, Lee Johnson and Harry Clark, have a suggestion that might help prevent some of these accidents—plan now to integrate some on-the-job safety concepts into your off-duty activities.

Far fetched?

Not when you think about it. First, only one accident occurs at work for every seven occurring off-duty. That's a pretty good endorsement for on-the-job safety habits. Actually, most of us live by pretty much the same standards on and off the job, so why the big difference in accident ratios? You must decide that for your-

self.

Start by reviewing the things you do and do not do at work to prevent accidents, then apply the same safety concepts to your vacation plans. Explain your ideas to the family and enlist their cooperation. Don't overlook a single day or hour to a planned safe vacation.

Above all, have the one indispensable vacation item—the automobile—thoroughly safety checked before starting out. Tires, lights, wipers, steering and brakes should work perfectly.

Each week in the United States 1000 people are killed and 34,000 injured in automobile accidents. Most frequent accident causes in order are discrepancies in the driver, automobile, highway and pedestrians. And the most common driver-committed errors are tailgating (following too closely), drinking, not yielding the right of way, traveling too fast, and crossing centerlines.

Oh, yes, don't forget, courtesy equals safety on the road.

NASA APPROVES CMIP PROGRAM; BIDDING AIDED

The National Aeronautics and Space Administration (NASA) Cost Reduction Board has approved Northrop Corporation's Cost Reduction Program.

Announcement of the approval was made in a letter to Thomas V. Jones, Northrop president and chairman, from Dr. Wernher von Braun. Dr. von Braun is director of NASA's George C. Marshall Space Flight Center in Huntsville, Alabama.

The certification of Northrop's Cost Reduction Program means the corporation is a formal participant in the NASA-Contractor Cost Reduction Program.

As such, Northrop and other formal participants will—under President Johnson's policy—receive recognition for cost reduction accomplishments in future award determinations.

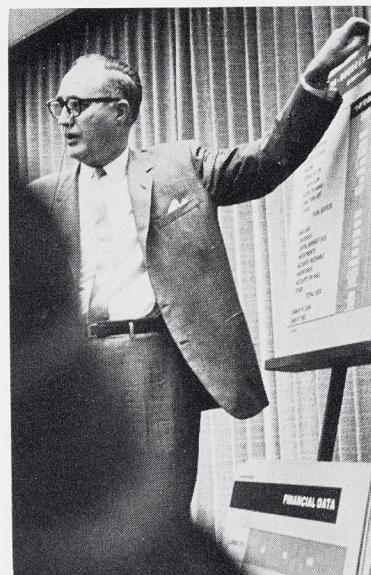
Ken Hornor, corporate coordinator of Northrop's Cost and Management Improvement Program said, "We are most pleased to have received this approval and recognize there is need to give continued emphasis to the program in order to retain this certification. There will be periodic reviews of our performance, and the first of these will be next Friday."

Aubrey D. Smith, chief of the Cost Reduction and Value Engineering office at the Marshall Space Flight Center, and John Miller, his assistant, will visit Northrop for this review.

Northrop's Cost and Management Improvement Program was established in August 1963. The program is conducted with the assistance of CMIP coordinators appointed by Division general managers. H. K. Davidson is Norair coordinator; Jim Penrod, Nortronics; and Les Hudson, Ventura.

GOLF SIGNUPS

Signups for the July 9 Northrop Norair golf tournament at the Circle R Country Club in Escondido will begin Monday and continue through Friday, July 1. Personnel Activities has announced.



James D. Willson, partially obscured by arm of an attentive listener, projects Northrop's financial growth in presentation to members of the Los Angeles Bank Credit Men's Association. Mr. Willson, Northrop's vice-president—Finance, predicted the company's contract acquisition would reach a half billion dollars for fiscal 1966 which ends next month. The bankers were guests of Northrop Norair recently.

Edison Page Awarded Contract in Greece

Edison Page, S.p.A. of Rome, Italy, an associate of Page Communications Engineers headquartered here, has been awarded a \$6 million contract by NATO for a large communications complex in Greece.

Under terms of the contract, Edison Page is responsible for selection and installation of all electronic and communications equipment. Hellenic Technical Works of Athens, the joint-venture associate, is responsible for the electro-mechanical requirements of the project.

Edison Page, S.p.A., has earned international recognition for outstanding performance in communications systems engineering, management, and implementation on similar complex projects for the NATO countries.

Formed in 1958 by Page Communications Engineers and the Societa Edison of Milan, Edison Page combines U.S. technology and Italian scientific capability for the engineering and construction of advanced communications networks.

AUTHOR'S CHALLENGE TO SCIENCE

'Will We Be or Won't We Be?' That's Henry's Question

When Henry Still, who is head of Public Relations at Northrop Ventura, asks a question, watch out. Not only might it take as much as 10 years to answer, it's likely to be of considerable magnitude.

During the tumultuous days at the close of World War II—in an ambivalent atmosphere of elation at peace and apprehension of the atomic bomb—Mr. Still asked himself: "Will the human race survive?"

Last month his personal struggle with the oft-repeated question was climaxed by the publication of his second book, *Will the Human Race Survive?*

(His first book, a biography of aviation pioneer Glenn Martin entitled *To Ride the Wind*, was published in 1964).

"Actually the book deals more with the challenges to the scientific community which must be met if we are to

continue to grow and expand," the author said in an interview this week. "There has never been any doubt in my mind that we will survive."

Water (desalination), power (nuclear energy) and space (land on which to live) is Mr. Still's three-fold challenge to the technological community.

"Today for the first time in the history of civilization men are actually at work upon the basic techniques which can provide unlimited expansion of humanity for centuries to come," he writes.

"When stripped to the core, what things do men need to live and grow in addition to food, clothing and shelter? They are three: 1. water, 2. power, 3. land on which to live."

With this as his outline, the author has skillfully managed to give historical background, the present situation and plans for the future on each subject. Interspersed with analyses of the three subjects is his own commentary on the peculiarities of man and his social order which have brought about the need for drastic, positive and immediate action.

On water, Mr. Still writes:

"Men have been much like children given a large box of candy. They eat it all in a day, become ill from the excess, then cry tomorrow because the candy is gone."

Solution of the water crisis depends on continuing technological developments in sea water conversion, he says.

"... There is every reason to believe that every city in the world located on a seacoast, the shore of a salty lake, or near an underground source of brackish water, can be utilizing desalted water at reasonable cost by the turn of the twenty-first century."

On power, he writes:

"Human history is written in the ingenious techniques and tools men have discovered to use... power. The story of man's propagation over the earth and beyond will continue to be written in the procedures he conceives to multiply the strength of his hands by the abundance of latent energy in the universe."

The search for techniques to control thermonuclear energy is the "Holy Grail, the true and permanent answer to the world's power hunger," he says.

At the present rate of energy consumption, the supply of deuterium (the fusion material which provides thermonuclear reaction) contained in the world's oceans would serve the human race for 20 billion years, the book points out.

On space, the author writes:

"There is no shortage of land. There are 33 billion acres of it on earth, only 10 percent of it now occupied either by people or food crops. Human toil and goodwill are the only ingredients needed to make proper use of this world... Water and power can make them all livable."

But despite all the room for expansion on earth, man will continue to be driven by something within him to explore and colonize the universe. This fact leads Mr. Still into one of the best short histories of our space program to date.

Water, power and space. Libraries have been written about each subject. But the author, who has been an "in-

(See AUTHOR, page 3)



Mr. Still

REAL JIM BLACK (BOTH OF THEM) STAND FOR SAFETY

Within Northrop Corporation personnel ranks are many family groups, yet Northrop Norair reports the first incidence of a father-son team serving together on a safety committee in the long history of safety committees at the Division.

The men are James S. Black, sr. of Forward Fuselage, Mate and Complete, and James S. Black, jr. of the Boeing Wing organization.

They are serving as members of the Workmen's Safety committee. The father-son relationship was not planned, since each man was selected for this key role independently by his supervisor.

The senior Mr. Black has been with Norair since September 1951 and the junior Mr. Black joined Norair in early 1952.

James Black, jr. is doing his bit to help keep the Black family ties intact at Northrop. His wife, June, is a former Norair employee who currently works for Nortronics at Palos Verdes. And his daughter's husband, Virgil Frazier, joined Norair last week as a machinist. A son, Dennis Black, worked for Norair for a time before leaving a year ago to enter college.



James, Jr.



James, Sr.

Maintenance Course Completed by Brazel

J. W. Brazel, a member of the Plant Engineering staff at Northrop Ventura, has completed a course in maintenance supervision conducted by the American Institute of Maintenance.

The 24-lesson course covered the basics of supervision and how they are applied to building maintenance, operation and sanitation.

Announcement of Mr. Brazel's completion of the course was made by Clyde W. Corder, chief of Plant Engineering.

The course is available only to men who meet AIM standards and have a minimum of one year of experience in building maintenance.

Mr. Brazel received a Certificate of Completion in a presentation at Northrop Ventura.

AUTHOR: His Triumvirate

(Continued from page 2)

side" observer of all three for 25 years as a journalist and aerospace public relations executive, is one of the first to chronicle that historic crossroads where all three topics are merging into a unified goal of mankind.

The book is unique in another aspect as well. Despite wealth of statistics and documentation used to support his analyses, the work is refreshingly readable.

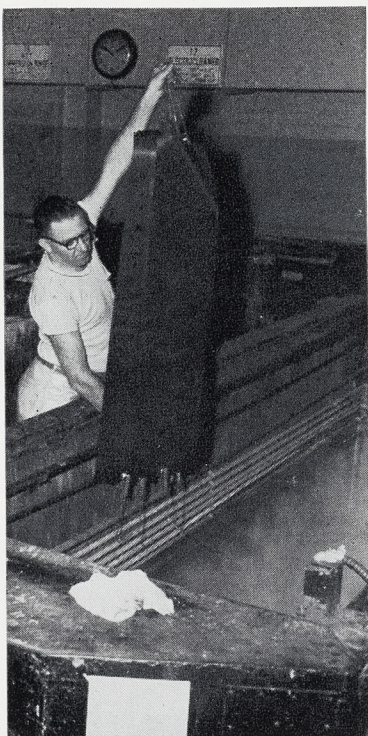
The reader is impressed with the author's ability to capture what is meaningful and express it with the fullest resources of the English language from the first sentence:

"On a mountainside in Colombia, in South America, there is a woman who picks coffee beans." to this look at outer space:

"... Out there, only a hundred short miles above the earth, there is no food to eat, no air to breathe. Heat and cold, untempered by a modifying blanket of atmosphere, range through hundreds of degrees above and below zero depending which side of you is toward the sun. Undiffused ultra-violet light and cosmic rays can be lethal. A meteor the size of a marble could destroy a spacecraft. Surely no one would suggest that people someday will live there? The answer is yes."

The biggest criticism of the book so far comes from the author himself: "I had too much material left over after completing the book," he said.

However, he has already contracted with Hawthorn Books, Inc. for a subsequent work on pollution of air, water and land to be published in 1967, which will use some of the leftover research material.



Norair's Elmer Alloway processes pliable skins, each two-thousandths of an inch thick, prior to bonding operation that produced solar panel substrate for Surveyor spacecraft like the recently successful moon probe. Work was Norair's initial bonding effort with titanium, produced solar panel substrates for number of Surveyor spacecraft.

About That Raise, Girls, Here's a Clue

Northrop Norair secretary Clare Honea has come to the aid of other secretaries who are faced with the dilemma of whether or not to ask the boss for a raise.

Responding to a letter to the editor in "P.S. for Private Secretaries" magazine, Clare advised the letter-writer to "... be certain that you are truly deserving ... be tactful and courteous ... be efficient and orderly."

"If you feel you have done your best at all times and try your hardest, by all means ask for that raise. You deserve it," she said.

Clare, who works in Marketing, isn't saying whether the theory has proven successful for her — but it has paid off. The editors of the magazine sent her \$10 for her answer to the worried secretary's problem.

July 4 Holiday

Monday, July 4, will be a holiday for all Northrop Corporation personnel in observance of Independence Day. Only those employees notified in advance will be required to work.

AD ASTRA PER ASPERA

Titanium Bonds Northrop, Moon

Northrop Norair's initial major work in the bonding of titanium is presently resting on the moon.

Aboard the history-making Surveyor spacecraft that has astounded the scientific world with its precise information on the lunar surface is an aluminum honeycomb sandwich panel with thin titanium skin upon which solar cells are mounted.

This entire component, called the solar panel, is the spacecraft's primary power source, both in flight and during operations on the moon in the lunar day.

Development of the supporting structure, called the solar panel substrate, marked Norair's initial production effort in the bonding of titanium, a material that holds many promises for its strength vs weight ratio, its resistance to corrosion, creep (stretch) and extreme temperatures.

Northrop is an industry leader in developing new techniques in forming, welding, machining, and bonding of titanium alloys. Phases of this work are being carried out in a broad titanium development program centered at Norair.

Manufacturing Research and Development at Norair headed by Barney Gaiennie was responsible for production of the solar panel substrate in a program that began in 1962 and concluded in 1964 with the delivery of the final unit.

George Larsen was Manufacturing R&D project engineer.

This effort was under subcontract to Hughes Space Systems Division, prime contractor for the Surveyor spacecraft, and called for 22 units.

Although titanium is an extremely versatile material with unlimited possibilities, it is also difficult to handle as participants in the Norair program found. For instance, the solar panel substrate's titanium skins are a mere two thousandths of an inch thick. That's only about half the thickness of ordinary writing paper. Its razor-sharp edges were a constant menace. And its pliable nature necessitated the use of material a mere 12 inches wide. For this reason skins were made up of overlapping sheets.

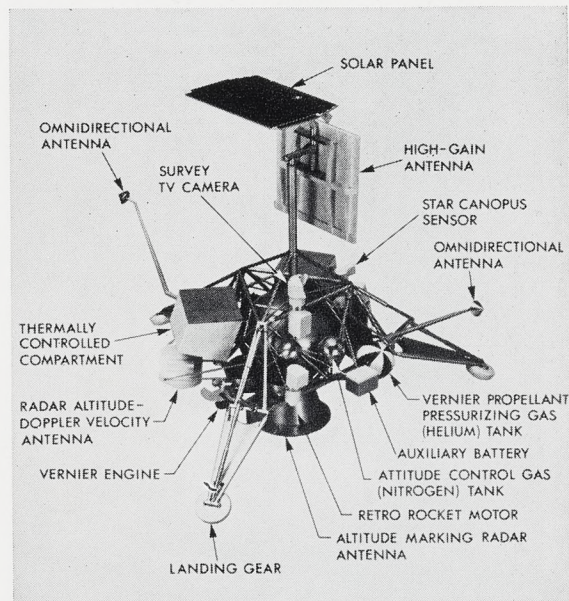
The Norair-produced substrates consisted of the thin titanium skins, honeycomb aluminum interiors and edges made up of hollow micro-balloons. Together, the unit measured about four feet long, two and a half feet wide and about three-eighths of an inch thick.

Mr. Gaiennie was high in his praise of the Norair Bonding organization for its efforts in this development project.

"They, like Manufacturing R&D, worked without previous experience or guidelines in this work," Mr. Gaiennie said. "The results were obviously worth the effort. And they have been extremely important to us in other programs involving titanium."

Each solar panel substrate was covered with 3960 tiny solar cells grouped in 792 different modules and connected in series-parallel to guard against complete failure in advent of a single cell malfunction.

The Surveyor solar panel is mounted atop a special mast. Wing-like, it folds away during launch. It is deployed by earth-command after the spacecraft has been injected into a lunar trajectory. It then locks onto the sun



Model of Surveyor moon landing vehicle shows location of solar panel (top) as well as other major components which, together, helped record an historic venture in man's conquest of space.

and generates power that is stored in a battery to operate most onboard equipment. In flight the solar panels supply about 89 watts of power. On the moon's surface at temperatures of 140 degrees Fahrenheit, the panels supply 77 watts and at 239 degrees Fahrenheit supply 57 watts.

Launched May 30 atop an Atlas-Centaur vehicle from Cape Kennedy, Florida, the Surveyor spacecraft covered the 247,420-mile trip to the moon in 63 hours. Within minutes of landing it began transmitting pictures of the lunar surface.

Shelly Speaks in Germany

Northrop's C. P. "Chuck" Shelly will be a principal speaker at the first annual conference of the German Association for Contamination Control meeting this week in Munich, Germany.

He will discuss "Management Approach to Contamination Control."

Mr. Shelly, a Nortronics Hawthorne general supervisor in Operations, is currently serving as national president of the American Association for Contamination Control (AACC), an organization he helped found five years ago and served as a national director (2 years) and executive vice president.

A long-time advocate of international controls on man's contamination problems, Mr. Shelly has been instrumental in helping nations outside the United States form contamination control working groups.

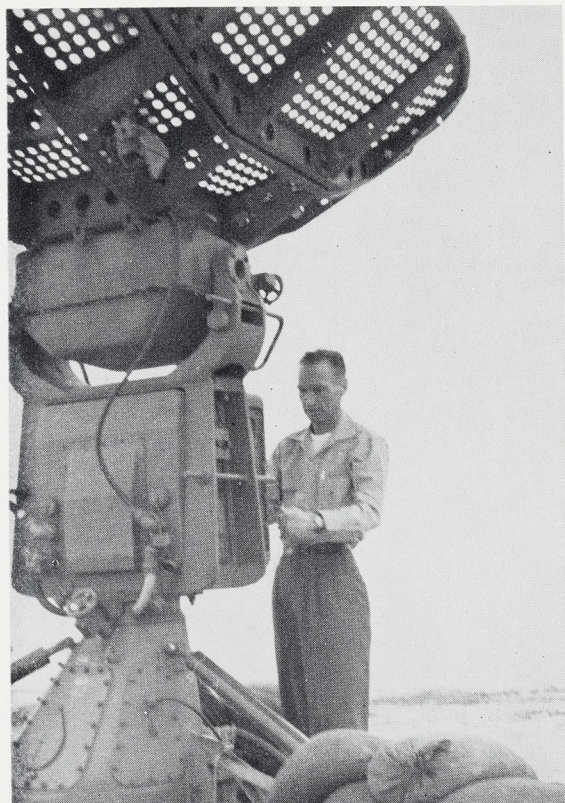
"Our friends in Germany are the first outside the United States to organize an association. They have been active for the past year and have representatives from about 100 industrial firms," Mr. Shelly said. "Sweden is currently contemplating an association."

En route to Germany this week, Mr. Shelly stopped off in Boston to preside at a meeting of the National Executive Council of the AACC.

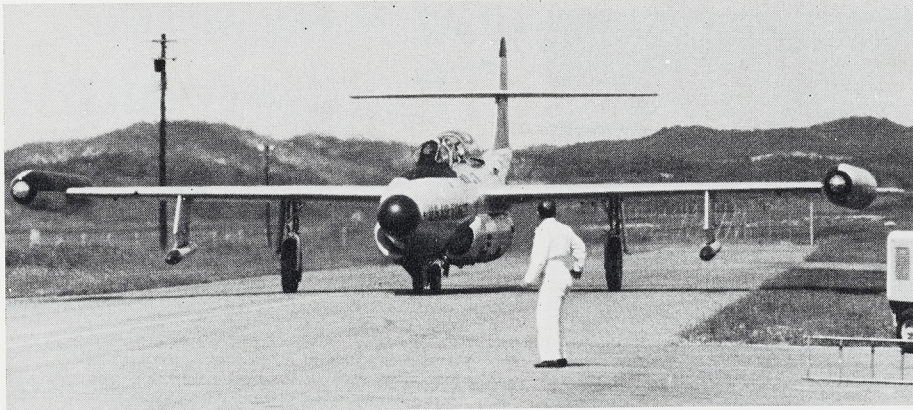
Mr. Shelly's talk, to be presented Friday, is one of several featuring international figures active in contamination control work.



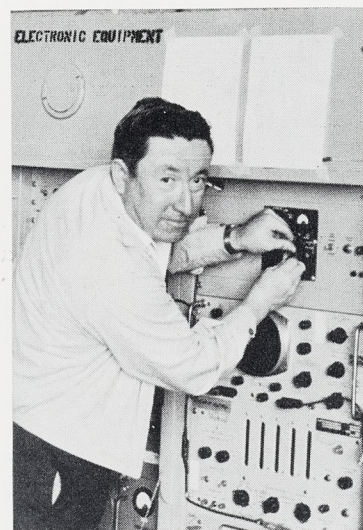
PHOTO OF THE YEAR—This NASA shot of astronauts Thomas P. Stafford and Eugene A. Cernan waving to crew of the approaching USS Wasp could rank as the best yet in the extensive coverage of America's space program. It was shot shortly after their Gemini spacecraft splashed down under a Northrop Ventura Ringsail parachute in the most accurate landing to date.



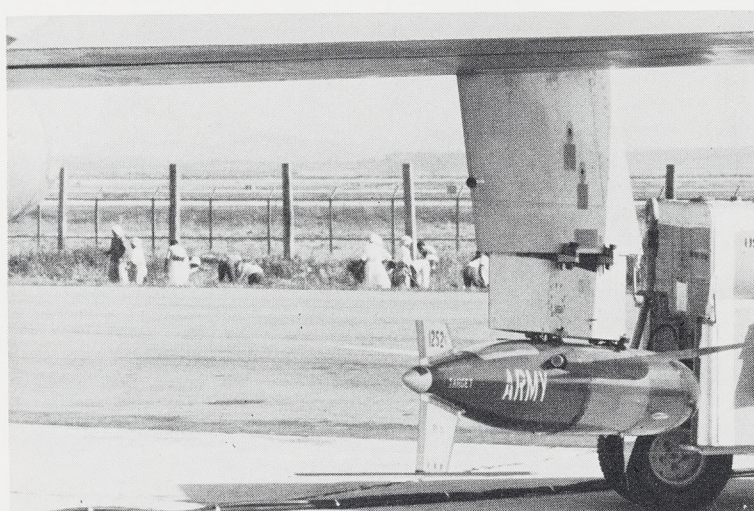
Bob Spies adjusts radar antenna at tracking station prior to launch of AQM-38A target drone. In addition to keeping the radio-controlled drone on its flight path, tracking station coordinates exercise with Army missile battery radar operators.



Four major activities of Northrop Ventura ground support personnel who provide target service to Army missile sites are: aircraft readiness (above), tracking station (right), logistics (below), and target readiness (left).



Back in the tracking station control center, Mr. Spies (right) keeps in touch with missile battery while D. W. Dooley (center) tracking station leadman, sends instructions to F-89 pilot who will launch the drone from 40,000 feet. Field supervisor L. W. Shaw is at left. Koreans (below) harvest grass near runway where F-89, with Northrop Ventura target, waits takeoff order.



SUPPORTING TARGET LAUNCH

On the Ground, Things Are Looking Up

In the absence of such tourist publications as "Okinawa on 50 Cents a Day" or "A Guide to Sunken Ships in the South China Sea," ground support crews of Northrop Ventura's Pacific Target Operations have developed an unusual diversity of spare time activities while on the annual 10-month tour of Nike and Hawk missile sites in Korea, Taiwan, Okinawa and Hawaii.

One of them helps a little Chinese boy with his spelling. Two others ship Hondas at their own expense everywhere they go.

Three of them have married while on tour since the program began in 1961.

An electronics buff's leisure time interest in equipment design has led to significant improvements in drone checkout hardware.

Several of the men carry New World culture with them in the form of a stereo record player.

Most all of them are camera bugs.

The work of the 18 men on Pacific duty is related to providing target practice for U.S. Army and Republic of Korea missile batteries, which, once each year, attempt to knock down the Division's AQM-38A supersonic drones.

Formerly designated the RP-76, the drone is propelled by a solid fuel rocket and is air launched from Northrop-built F-89 jets.

Ground support men make up three crews: the target group, aircraft support group and tracking station group. L. W. Shaw is field supervisor, and Rod Hoover in the home office is over-all supervisor of both the Pacific and Panama Canal Zone target operations.

The aircraft support team, under Leadman Mike Cantelmo, is the largest of the three and

EDITOR'S NOTE: This is the second of two articles on Northrop Ventura's Pacific Target Operations. The first article, which featured pilots of the Northrop-built F-89 jets used in launching target drones, appeared in the August 25, 1965 edition.

is responsible for keeping the three F-89's assigned to the operation in the air.

In addition to day-to-day maintenance, the men also give the planes a complete overhaul at the end of each year.

The target crew under Leadman C. T. Pulido is charged with unpacking and inspecting each drone, calibrating the instrument package, and installing the bird on the plane.

The tracking station, headed by D. W. Dooley, keeps the radio-controlled drone on its flight path and coordinates the exercise with missile battery radar operators.

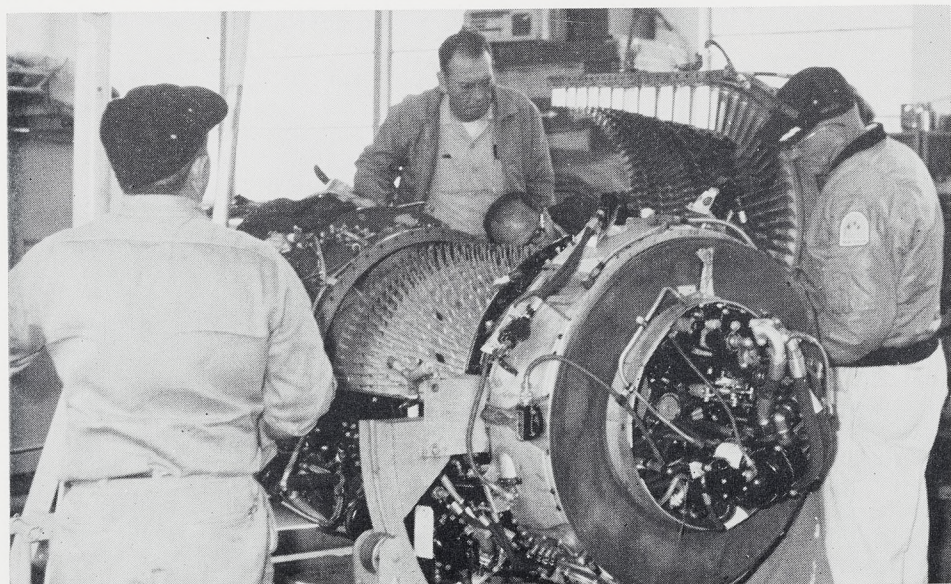
Quality Control is represented on the tour by George Bradley and Robert LaFitte.

Of the 18 men presently on the Pacific tour, six were members of the original 1961 group, including Mr. Shaw, Mr. Bradley, R. E. Spies, H. P. Wright, J. W. Thompson, and J. E. Randall.

It has been five years of steady improvement in the Division's service. The target group has cut in half the time required to prepare a drone. On a good day, the over-all team can send a drone winging to the firing area in 20-25 minutes after the go-ahead is received from the battery.

Complete turnaround of the aircraft, including new drones installed, can now be accomplished in about 35 minutes if required.

One of the biggest headaches of the operation (See PACIFIC, page 5)



L. C. Morris, Bob LaFitte and H. H. Hawley go over F-89 engine at Okinawa. Mr. Morris and Mr. Hawley, members of the aircraft support group, are knowledgeable veterans of Northrop aircraft maintenance through their work at other facilities. Mr. LaFitte is half of the two-man Quality Control team which travels with the ground support crews in the Pacific.



A major activity of the Northrop Ventura ground support crew is logistics, and everyone participates. That's J. W. Thompson, A. W. Honeywell and George Bradley (at left) assisting in loading AQM-38A supersonic target drones on C-120 Globemaster. Aircraft belongs to Military Airlift Command, which transports equipment between target launching sites.

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

For Sale

Sofa, contemp. decorator design, sauterne color, 101" width, 2 seat cushions, 4 back cushions, custom made at \$867 cost, delivered new last month, \$450. Bel Air, 472-2571. A

Chevy II Nova, 1963, s.s., floor auto., 37,000 miles, \$1500. Harbor City, 325-8932. A

Boat, 12' Burchcraft Fisherman, 7½ hp motor, trailer & hitch, \$250. La Mirada, WH 1-1865. A

Organ, Thomas elec., 2 keyboard w/foot pedals, has pre-set, making 3rd keyboard, \$550. Redondo Bch., OS 5-4870. A

Plymouth, 1955 Belvedere sta. wag., auto. trans., new eng., \$400. L.A., 645-3381. A

Piano, maple winter spinet, \$525. Los Alamitos, 213-431-4010. A

Fish Aquarium, 15-gal., 2 1-gal. fish bowls, \$7. Bellflower, ME 3-6106. A

Tires, Michelin X, 4 near new 6.40 x 13 w/new tubes, 40,000 miles wear remaining, \$100. Huntington Bch., 714-847-2648. A

Welding Hood, Huntsman w/lift, #10 lens, used 2 hrs., \$11. Torrance, FR 1-1096. A

Hi-Fi Console, Dynaphone radio-phonograph-microphone-amplifier, for elec. guitar, good tone, \$60. Hawthorne, 676-0418. A

Shotgun, J. C. Higgins, model 20 12-ga. vented rib, adj. choke, pump action, \$30. Manhattan Bch., 374-5635. A

Pontiac, 1957 Chieftain, eng. very good cond., \$175. Torrance, 371-7629. A

Dirt Bike, 1964 Dot Scrambler, \$450. Lomita, DA 5-3494. A

Dinner Ring, man's, ½ carat blue white diamond set in brush finished mounting, appraised at \$400, \$250. Santa Susana, 805-527-1974. A

Refrigerator, 12 cu. ft. Coldspot, white, \$95. Inglewood, 634-8077. A

Hi-Fi Console, Hoffman AM-FM tuner, Girard changer, Jensen speakers, walnut cab., \$75. Torrance, DA 8-8797. A

Surfboard, Bing, slight nose damage, comp. repair kit, \$40. Hawthorne, 644-2592. A

Tires, 2 tubeless 7.50 x 14, w/s/w, for spare or trailer, \$1 ea. Hawthorne, 676-0758. A

Mobile Home, 50' incl. 35' cabana, carport, 8' x 8' store room, \$3850. Gardena, 329-5879. A

VW Micro Bus, 1962, 28,000 miles, \$1050. L.A., 451-0251. A

Skin Diving Outfit, complete, sell separate or \$45. Lynwood, 632-2642. A

House, 3-bdrm, 1¾ bath, bltins, dishwasher, fireplace, 2-car gar., \$32,500. Torrance, FR 8-1350. A

Mercury, 1959 Montclair, r/h, p/s, p/b, \$385. Inglewood, 674-5445. A

Chevrolet Impala, 1962, 327 eng., auto., 2-dr. h/top, p/s, deluxe radio, \$1195. Norwalk, 864-9532. A

Pilots, fly Beech Bonanza in Hawthorne Flying Club, \$450. L.A., 479-1198. A

Lot, Feather River, West Fork, on paved road, many trees, no dn. pymt., \$10,000. Hawthorne, OS 9-4723. A

Austin Healey, 3000 MK III, 1964, wood dash, wire wheels, 4-spd. & o.d., new tires, mufflers, \$2350. Redondo Bch., 379-7567. A

Porsche 356, 1953, super coupe, solid bearing crank, 2-pc. case, Porsche brakes, 15" wheels, 16" avail., \$750. Woodland Hills, 346-6675. A

Boat, 13½', trailer, 25 hp motor, elec. starter & bait tank, \$450. Inglewood, OR 1-1660. A

Pontiac, 1959 Safari wagon, air cond., p/s, low mileage, top rack, \$625. Beverly Hills, CR 6-3534. A

Motorcycle, 1965 Ducati 250 cc Scrambler, 1000 miles, extra tire & sprockets, other access., \$595. Hawthorne, OS 6-9736. A

Motorcycle, 1965, Royal Enfield, 750 cc, metal flake, chrome plated, \$850. Inglewood, 370-4988. A

Wiglet hairpiece, black, used once, 100% human hair, case, cost \$24, \$12. Hawthorne, 644-2130. A

Volkswagen, 1956, r/h, w/w, \$625. Covina, ED 1-3940. A

Clothes Dryer, \$50. Garden Grove, 638-4916. A

Mobile Home, Angelus, 10' x 45', 1-bdrm., front kitchen, alum. awnings, new furnace, \$2850. Gardena, 329-5637. A

Boat, 15', fiberglass, elec. start Evinrude 25, lge. wheel trailer, many extras, \$400. Torrance, DA 6-5558. A

Piano, Fairbanks, upright, mahogany, new ivory on keys, felt hammer pads & pedals, full keyboard, bench, \$125. Box 1201. A

Pontiac, 1957, Star Chief 2-dr. h/top, r/h, p/s, dual range Hydromatic, near new Premium nylon tires, 64,000 act. miles, 1 owner, \$300. L.A., OL 7-3074. A

Sting Ray, 1964 coupe, 300 hp, 4-spd. trans., 2.54 low, positraction 3.08, AM-FM radio, p/s, p/b, hard & s/tops, \$3000. Wilmington, 830-1492. A

Volkswagen, 1966 sedan, low mileage, walnut dash, spinner wheels, many extras, \$2350. L.A., 276-4543. A

Surfboard, Bing, 9'1", \$80. Hawthorne, 644-3487. A

Bar, 7' maple w/canopy, lighting, brass rail, bar finish, \$150. Torrance, 835-7780. A

For Sale

Pram, 8' w/oars, in good cond., \$25. Rolling Hills, 377-5384. A

MGA Roadster, 1962, 1600 Mark II, r/h, new engine, \$1200. Port. Bend, 377-8444. A

House, 4-bdrm, 2 bath, family room, bltins, fully landscaped, 5% dn., \$23,975. Thousand Oaks, 805-495-7927. A

Range, gas, \$50. Hawthorne, OS 5-7965. A

Rug, oval, wool, hooked-type, approx. 9x12, predominantly green, \$40. Fullerton, 714-626-1521. A

Camera, Argus, mod. C3, incl. flash attach., case, & light meter, Argus, \$22. Torrance, 328-5655. A

T-Bird, 1956, h/top, silver gray, fresh o/haul, paint & tires, auto. trans., orig. owner, \$1100 or best offer. Pacific Palisades, 454-2057. A

Poodle, miniature, silver gray, male, AKC, 2 yrs. old, needs good home, \$30. Gardena, DA 3-7244. A

Porsche, 1953, convt., 1500 super, new top, eng. needs work, 4-spd. synchromesh trans., \$250. Downey, 923-1521. A

Land, 20 acres near Willow Springs, Antelope Valley, East Kern water dist., \$495 acre. Torrance, FR 8-1026. A

Falcon, 1963, 2-dr., 6 cyl., auto. trans., r/h, \$925. Inglewood, OR 4-1654. A

Volkswagen, 1965 Squareback, 1500 sedan, \$1800. Fullerton, LA 6-6759. A

Honda 90, less than 400 miles, \$285. Hawthorne, OS 6-3912. A

Encyclopedia Set, 1958 Britannica, w/case, \$90. Hawthorne, OS 5-7729. A

Motorcycle, 1956 Triumph chopper, \$500. Redondo Bch., FR 1-3964. A

House, 3-bdrm, 2-bath, lge. covered patio, bltins, 5¼% mortgage, \$141 mo. pymt., \$27,500. Torrance, 325-0039. A

House, 3-bdrm, 2-bath, 2-car gar., 12'x24' encl. patio, 10% dn., will finance, near Norair, \$27,500. Torrance, 327-3160. A

Ford Galaxie 500, 1959, 8-cyl., p/s, r/h, 2-dr. h/top, \$350. Hawthorne, 675-5057. A

House, 2-story, 4-bdrm., den, 2-bath, fences, 2 patios, used brick landscaping, GI, \$23,500. Simi, 805-526-5365. A

Chevrolet, 1959 Bel-Air, auto. trans., p/s, new tires, \$225. Inglewood, OR 3-2840. A

Wall Heater, Mission Sunair, 8750 btu output, like new, \$25. Hermosa Bch., FR 4-1889. A

Chevrolet, 1958, station wagon, r/h, p/s, w/s/w, \$350. Rolling Hills, FR 5-5761. A

Steel Sprockets, new hardened, ½" pitch, ¾" & 1" bore, 20 & 40-tooth, 5/8" bore, 25-tooth w/hub, ¾" bore, 32-tooth w/hub, \$1.49 ea. Inglewood, 674-3953. A

Outboard Motor, 5 hp, used very little, cost over \$200. \$50. Torrance, FR 5-2929. A

Runabout, 16' fiberglass w/steering assembly, 6' beam, 21½' freeboard, foam bilge, glass laminate floor, \$175. Box 1202. A

Dresser, 6-dwr., Danish walnut, \$40. Torrance, 375-2018. A

Refrigerator, Westinghouse, crosstop freezer, \$35. Hermosa Bch., 374-5425. A

House, 3-bdrm, family rm., elec. appliances, sprinklers, block walls, 1700 sq. ft., near Fashion Square, \$28,900. Santa Ana, 633-3657. A

Pistol, .22 cal. repeater, Belgian Melior, \$50. Hawthorne, OS 6-0637. A

Washer, \$45. L.A., 645-5169. A

Honda, 50cc, C-102 street bike, 1965 new elec. starter, windshield, mirrors, \$200. Inglewood, 754-3946. A

Train, 3/16 American Flyer, 5 switches, 53 pl. track, 2 locos, 8 cars, other access., \$30. Fullerton, 714-871-4775. A

Mobile Home, 12x55, extended living rm., kit, Golden State, furn., lots of extras, \$10,500. Anaheim, 525-2617. A

Dishwasher, RCA delux bltin, yellow, \$125. Anaheim, 524-1728. A

Home, 3-bdrm., family rm., 1¼ bath, lge. covered patio, sprinklers, dishwasher, forced air heat, 1 mile from San Diego Fwy., \$24,900. Garden Grove, 893-8721. A

Square Dancing Dress, ladies' size 12, blue & white checked gingham, worn once, \$8. Hawthorne, OS 9-6334. A

FM Tuner, Metronome, fruitwood cabinet, \$5. Torrance, 323-8089. A

Crib w/mattress, \$15. Inglewood, 674-6395. A

Chevrolet, Greenbrier, 1964, 3-seat, 4-spd. trans., delux mod., new tires, \$1800. Malibu, GL 6-2559. A

Cabin Cruiser, 28', nearly complete, Grey marine eng., sleeps up to 6, galley area, \$1500. Anaheim, 827-4501. A

Boat, 14' glass catamaran power cat w/35 hp elec. start Mercury engs., cust. cover, 2 extra props, trailer, \$800. Gardena, 675-2331. A

Cushions, complete set, for 10' Alaska camper, \$30. Hawthorne, OS 9-6449. A

Ford Fairlane, 1957, V-8, auto. trans., \$300. Hawthorne, 644-3501. A

Chevrolet, 1957, 4-dr., V-8, stick shift, glass pak mufflers, \$275. Torrance, 375-0165. A

Pups, weimaraner, show quality, AKC registered, \$100. Rolling Hills, 377-1281. A

Chevrolet, 1961 4-dr. sedan, auto. trans., 6 cyl., r/h, \$550. Inglewood, 678-1621. A

For Sale

Lot, 80'x100', at Snow Summit Estates, Big Bear Lake, 1 block from ski slope, \$6950. Fullerton, 525-1677. A

House & duplex, room to build, near Auto-netics & Nortronics, will take 2nd T.D., \$30,000. Brea, 528-4553. A

House, 2-story, 4-bdrm., 2-bath, fireplace, near school & golf course, \$27,500. Torrance, 375-6071. A

Range, gas, RCA Wedgewood, 36" deluxe chrome top, \$50. L.A., AX 4-0465. A

Pups, collie, 5 wks. old, AKC show quality, males & females, \$75 & up, Simi, 805-526-8674. A

Diamond Wedding Ring Ensemble, orig. cost \$200 set, size 7, \$100. So. Gate, 566-1670. A

Duplex, 1 block from Norair, 3-bdrm., 1½ bath, bltins, dishwasher, fireplace, plus apt., 1-bdrm., 2½ yrs. old, \$32,500. Hawthorne, 679-1307. A

Coffee Table, mahogany, glass top, \$8. Inglewood, OR 7-5276. A

House, 4-bdrm., 2-bath, family-bk. bar, bltins, fireplace, insul., sprinklers, many extras, 2250 sq. ft., 1½ yr. old, \$2700 dn., in Dominguez, \$30,000. Compton, 632-4978. A

Wet Suit, 3/16 rubber, h. d. zippers, hood, size 40-42, mask, & accessories, complete, \$50. Torrance, 323-4257. A

Oldsmobile 88, 1955 4-dr. Holiday sedan, r/h, p/b, p/s, auto. trans., good tires, \$200. P.V. Pen., 377-5907. A

House, 4-bdrm., family rm., 2½ baths, 1 acre, horses OK, near Northrop Ventura, \$35,000. Somis, 805-482-1186. A

Motor Scooter, Lambretta, 150 cc, 1962, 10,000 mi., sound mech. & tires, \$250. Anaheim, 776-1023. A

Jaguar, 1963, auto., radio, p/s, 34,000 miles, \$2500. Corona Del Mar, 673-7258. A

Trailer, Globe, 13½', sleeps 4, fully equipped, \$500. Gardena, 673-0995, 671-8413. A

House, 4-bdrm., 1¼ bath, bltins, service porch, G.I. 5¼% loan, \$36,500. P.V. Pen., 378-0120. A

Refrigerator, Frigidaire, 18 cu. ft., frost-free, bottom freezer, yellow, \$200. Harbor City, 326-1856. A

Bedroom Set, dble. bed, spring & mattress, hi-boy dresser, vanity & chair, \$50. L.A., AX 2-3445. A

Washer, wringer-type, \$25. S. Gate, ME 3-2395. A

Speaker System, stereo, 4 speakers, 2 encls., ea. side has 10" freq., flexedge, Woofer w/cambic suspension, 3" wide dispersion, many extras, \$75. Wilmington, TE 5-9070. A

Mobile Home, 10'x50', birch paneled int., fenced patio w/40' lg. awning, lge. rms., ocean view, low space rental, \$4950. Pac. Palisades, GL 4-3642. A

Oldsmobile, 1963 Super 88, 4-dr. h/top, factory air, r/h, p/s, p/b, p/w, new tires, \$1985. Redondo Bch., FR 2-8502. A

Chevrolet, 1959, 2-dr. business coupe, no rear seat, \$75. Manhattan Bch., 374-2006. A

Pontiac, 1960, Bonneville, sta. wag., p/s, p/b, auto. trans., r/h, new tires & brakes, 52,000 orig. miles, \$850. Orange, 633-4378. A

Home, 5-bdrm., 2-story, 2500 sq. ft., family rm., sep. dining, 3 baths, prof. landscaping w/sprinkler system, 2 yrs. old, 10 minutes from Anaheim facility, \$37,500. Orange, 714-633-2406. A

Movie Camera, Jelco 8-EC-1, 8mm cine, 3 turret lenses, bltin exp. meter & filters, trigger pistol grip & leather carrying case, \$35. P. V. Ests., FR 7-2294. A

Surfboard, Bragg 8'11" long, wgt. 22½, 3½" thick, clear deck, cus. finish, \$65. Hermosa Bch., 372-6755. A

Air Conditioner, (auto), Mark IV & compressor w/9-blade thermo-fan, brackets to fit 1960 V-8 Chevrolet, \$150. Placentia, 528-5006. A

Awning for camping, lge. orange & white nylon, complete w/center pole, nylon ropes, & stakes, \$15. Box 1203. A

Home, 3-bdrm., lge. den, low down, 1st mort., taxes & insur. approx. \$150 mo., \$21,900. Gardena, DA 9-2904. A

Guitar, Guild elec., single pickup, cost \$175; \$75. Fullerton, 879-2857, LA 5-9633. A

Home, 3-bdrm., 1½ bath, dishwasher, lge. covered patio, 18'x20' sep. rumpus rm., block walls & planters, terrace, tropical landscaping, fruit trees, walk to Northrop, easy terms, \$25,500. Hawthorne, OS 6-8842. A

Amateur Equipment, Gonset G66B BC thru 10 meter receiver & G77B 80 thru 10 meter transmitter, plus power supplies, \$90. Panorama City, 894-3244. A

For Sale

Piano, bench, upright, oak finish, recond. by Penny-Owsley, \$175. Torrance, FR 5-8804. A

Acreage, 4 40-acre parcels, 18 mi. to Lake Isabella, mtn. timber, 10% down, \$220 to \$420 acre. Redondo Bch., FR 4-2945. A

Ford, station wagon, 1959, new paint, runs well, \$500. Inglewood, EA 2-5068. A

Home, near Norair, 3-bdrm., family rm., fireplace, will carry loan, \$24,500. Gardena, OS 5-4354. A

MGTD, 1952, excel. cond., \$400. Gardena, FA 1-1186. A

Pontiac Catalina, 1960 convt., new top, brakes & battery, \$795. Box 1204. A

Volkswagen, 1966, 1600 Fastback, just delivered from Germany, 185 miles, w/s/w tires, \$2495. Inglewood, 673-1589. A

Chevy II, 1962 Nova convt., auto., b/seats, \$980. Venice, 823-2701. A

Chrysler Imperial, 1954, full power, \$375. Torrance, DA 9-8996 before 3:15 p.m. A

Dinette Set, 7-pc., in good cond., \$35. Hawthorne, 675-0407. A

MGA, 1956, new top, & 2 tires, radio, \$375. P. V. Ests., 378-5944. A

Falcon, 1960 Ranchero, good cond., \$575. Gardena, DA 9-9046. A

Guitar, Spanish Fender Malibu, w/case, cost \$180; \$135. P. V. Pen., FR 8-2810. A

Tape Recorder, Akai, 2 speakers, 2 microphones, \$350. Inglewood, OR 1-1351. A

Home, 3-bdrm., 1½ bath, lge. living rm., fireplace, sep. dining rm., 17'x34' swim pool w/heater, near schools, churches, will carry 2nd, \$29,500. Gardena, DA 4-1631. A

Bed, modern, dble., w/walnut head & foot boards, box springs & mattress, \$40. L.A., 671-0122. A

House, 2-bdrm., white frame, fenced, ¾ acre, shade trees, 10 citrus trees, near Elsinore, lake view, \$10,700. Torrance, DA 4-5422. A

Bath-a-net, near new, \$15. Gardena, DA 9-3436. A

Ford Galaxie 500, 1965, r/h, p/s, factory air cond., 15,000 miles, \$2395. Long Bch., GA 3-1363. A

Wanted to Buy

Tape Deck, monaural, prefer Heath or other high quality unit. Rolling Hills, 325-3057. B

Bedroom Set, prefer without mattress & box springs. Inglewood, OR 2-4486. B

Valiant, 1963, auto. trans. Gardena, 323-5685. B

Engraver Machine, copy type masters for pantograph. Gardena, OS 5-5258. B

Typewriter, good used, standard carriage, late model. P.V. Pen., 377-8812. B

Mandolin, must be good condition, prefer Martin or Gibson. Culver City, VE 9-5438. B

Desk, dble. pedestal, wooden, in good condition, reasonable. Fullerton, 879-1447. B

FREE (To Be Given Away)

Kittens, 6, want good home. Hawthorne, 679-6581. D

Rentals Offered

Apt., 2-bdrm. & 4-bdrm., near bay & beach, make reservations, avail. June, July & Aug., 4-bdrm. June & July, \$125 & \$200 wk. Inglewood, 672-3764. E

Apt., 3-bdrm., 2 baths, \$165 mo. L.A., WE 5-4006, WE 5-9148. E

Apt., 1 or 2 bdrm., furn. or unfurn., heated pool, near Norair, \$105 & up. Ventura, 321-0928, 805-642-5405. E

Apt., 2-bdrm., gar., disposal, small yard, 5 mins. to Northrop, \$95 mo. Hawthorne, 325-5705. E

Apt., 2-bdrm., unfurn., lge. closets, bltins, closed gar., laundry fac., adults only, no pets, \$125 mo. Torrance, 375-1645. E

Apt., unfurn., 1-bdrm., bltins, incl. refrig., laundry fac., gar., 15 minutes to Northrop, adults, avail. July 1, \$90. Redondo Bch., 379-4628. E

Apt., deluxe 1-bdrm., pool, bltins, \$95 mo. Redondo Bch., 376-2117. E

Cabin, Green Valley Lake, \$35 weekends; \$60 wk. Torrance, 320-2002. E

Vacation Cabins, Lake Gregory & Crestline, make reservations early for June thru Sept., \$25 weekends, \$60 wk. Venice, EX 1-2040. E

Vacation Cabins, Idyllwild, stream, patios, secluded, \$25 w/end, \$50 wk. & up. L.A., PL 4-5288. E

Bachelor Apt, furn., 2 blocks from ocean, sep. bldg., no pets, no overnight guests, \$100 mo. Hermosa Bch., FR 6-1636. E

Going my way?

Rides Wanted

7:30 a.m. — 4:15 p.m.

Hawthorne Blvd. & Rosecrans at 139th, Hawthorne. Julie Borrego, Norair, ext. 4388. 3

8 a.m. — 4:45 p.m.

Orange & Del Amo, Long Beach. W. H. Covert, NSL, ext. 2721, GA 3-1363. 5

Figueroa & Anaheim, Wilmington. Tom Henrich, Norair, ext. 2425, 835-9070. 5

Venice & Sepulveda, Los Angeles. Sheldon Ossoff, Norair, ext. 1016, 837-2916. 5

Rides Offered

8 a.m. — 4:45 p.m.

Orange & Del Amo, Long Beach. W. H. Covert, NSL, ext. 2721, GA 3-1363. 15

Venice & Sepulveda, Los Angeles. Sheldon Ossoff, Norair, ext. 1016, 837-2916. 15

Rentals Offered

Apt, unfurn., 1-bdrm. & 1-bdrm. studio, 3 blocks from King Harbor, piped music, bltin vacuum, gar. storage, \$105 up. Miraleste, TE 3-9862. E

Room in bachelor home, house privileges & all utilities pd., \$60. mo. Box 1205. E

Apt, unfurn., 2-bdrm., 2-bath, air cond., dishwasher, pvt. balcony, children's play-yard, \$155 mo. Inglewood, FR 5-0867. E

House, 3-bdrm., air cond., 2-car gar., lge. yd., dishwasher, in Lakewood, \$160 mo. Cypress, 714-828-9076. E

Apt., 2-bdrm., unfurn., garage, \$105. Redondo Bch., FR 2-5310. E

Apt., 2-bdrm., bltins, garage, near So. Bay shopping center, \$110. Redondo Bch., 374-5879. E

Apt., 2-bdrm., lower unit, stove, bltins, 2 bks. from Norair, avail. July 1, \$115 mo. Hawthorne, OS 6-7417. E

Apt, furn., single, 1 block from Northrop, gar. & utilities furn., \$80. Hawthorne, 675-6481. E

Apts., deluxe, furn or unfurn., 2 & 3 bdrm., bltins, carport, storage space, hot water & trash pd., near Norair, \$140-\$175 mo. Hawthorne, 679-1358. E

Apt., girl wanted to share 2-bdrm., furn., util. pd., in Hollywood, \$65. mo. Alhambra, AT 4-5698, HO 4-1084. E

House, 3-bdrm., completely furn., garbage disp., dble. gar., within walking distance of Northrop, \$200 mo. Gardena, 324-0730. E

Lost

Ring, silver w/single pearl inset, much sentimental value to owner, reward for recovery & return. Call Lost & Found, ext. 1972 or L.A., 931-6759. J

Personals

In deepest appreciation of the many lovely cards & flowers sent in memory of our husband & father, Donald McCulloch. MRS. LOUISE MCCULLOCH & SONS. L

I wish to thank all my friends at Nortronics Anaheim for the beautiful flowers & expressions of sympathy for my family & myself upon the death of my father, Clarence V. Striegel. ROBERT L. STRIEGEL. L

Share my home or rent lge. bdrm. w/½ bath, pvt. entrance, kitchen privileges, 1 mile from Norair. Hawthorne, 676-8833. L

Share driving & expenses to Pittsburgh, Penna., leaving on or around June 24, return by July 18. Hawthorne, 675-9540. L

We wish to express our deep appreciation for your kind sympathy during the passing of my father. MR. & MRS. JACK SANTICH. L

To our many friends & co-workers, my wife & I extend our heartfelt thanks & our appreciation for the wonderful retirement party on June 9, 1966 & for the many beautiful gifts. D. S. (SCOTTY) & ANITA FIELD. L

I wish to thank all for the many expressions of kindness during Nita's illness & passing. TED CORLEY. L

For Sale or Trade

Triumph TR-3, convert., 1959, low mileage, excel. mechanical cond., \$500 or trade for full-sized car. W. Covina, PL 6-2587. M

Campers Change Name

Olive Carmichel is the winner of an NRC Camping Club contest to select a new group name. The name: Northrop Wanderers.

FDR BOUGHT FIRST

This year marks the 25th or Silver Anniversary of U.S. Savings Bonds. The first Series E bond was sold to President Franklin D. Roosevelt on May 1, 1941.

PACIFIC: Five Years of Improvement

(Continued from page 4)

tion, transporting equipment from site to site, has also been alleviated considerably through innovations in both packaging and reduction in size of some of the electronic equipment. More than 32,000 pounds of cargo is carried, exclusive of the targets themselves.

The target group today requires about eight boxes, compared to 38 five years ago. The tracking group has reduced its gross weight

shipments by 1600 pounds in the same period.

(Transportation of equipment is handled by the Military Airlift Command. The Air Force also lends a hand in providing fuel and facilities for the F-89's aircraft.)

A separate crew, ranging from 10 to 14 men, provides the same target service for U.S. Army units in the Panama Canal Zone. Headed by R. W. Legg, the groups use El Paso as a staging and supply area.

Softball Nine Chalks Up Three Wins

Northrop Ventura's softball team is beginning the 1966 season the same way it ended last season —by winning.

The team, which finished second last year in its league, began its practice season two weeks ago and defeated Technology Instrument Corporation, 7-5, on seven hits.

Starting pitcher Ralph Reeves went all the way.

Last week, on June 13, Andy Andrews pitched a complete game as Northrop defeated Von's Market, 8-3, at Thousand Oaks High School.

Last Wednesday, Chuck Taylor's one-out home run in the seventh inning broke a 7-7 tie and gave the team its third straight win, over Newbury Park Academy.

Mr. Reeves, in relief of John Morrison, gained his second win. Northrop trailed at one point, 5-1.

Two nights ago, on Monday, a qualifying game matched Northrop and the Thousand Oaks Church of the Latter Day Saints, to determine the league in which each club is placed. The three leagues, sponsored by the Conejo Recreation and Parks Department, are classified Open, A and AA.

Returning from last season's team are manager-first baseman Taylor, pitcher Andrews, shortstop Ron Lancaster and left fielder Lou Dumond.

Mr. Taylor recently cut the roster from its initial 22 to the 15 required by the league. The season is expected to begin within two weeks.

All games will be played at 6 p.m. Thursdays at Thousand Oaks High School.

Aiding Mr. Taylor in running the team will be Herb McKinney, who also assisted last season.

TRAINING

(Continued from page 1)

U. S. travel, Mr. Loane, Mr. Beck and Mr. Koopman have spent several months in Italy teaching the MQM-57 (SD-1) to the Italian Military.

The U. S. Navy operates a similar target designated the MQM-36A, formerly the KD-2R-5. Permanent representatives, Frank Nesemeier and Bill Perrotto, are stationed at Norfolk and San Diego to provide technical services.

APOLLO TOUR



Apollo Test Project Engineer Leon Scrydloff, shows an Apollo Earth Landing System mockup to 25 machinist trainees who toured Northrop Ventura recently as part of the federal Management Development Training Act. The young machinists were shown all major machine operations.

Career Day Program Aided By Division Specialists

Two Northrop Ventura personnel representatives have taken part in the first Ventura County Student Placement Day program, interviewing 33 graduating high school seniors.

Ken Geller and Johnnie Via joined representatives from 29 other Ventura County employers in providing vocational guidance for more than 150 students.

The students, who graduated this month, represented Fillmore, Ventura Union, Oxnard, Pt. Huene and Thousand Oaks High Schools.

Employers, in addition to Northrop, included public utilities companies, oil companies, department stores, banks, the military, the City of Fillmore and the U.S. Government.

Most of the students have taken vocational courses and do not intend to enter college.

Most of the students who talked to Mr. Geller and Mr. Via were interested in careers in clerical work. Several of the young men expressed an interest to work in sheet metal fabrication and mechanics.

According to Mr. Via, the program, held at the Ventura County Fairgrounds, was a significant success.

"I wish we had had time to talk with these boys and girls

longer," Mr. Via said.

"It was very inspiring to note their self-assurance, their appearance and conduct. It reaffirms your faith in young people to see their interest in this type of program."

The placement day was coordinated by the Ventura County Vocational Resources Committee, with which Northrop Ventura has worked on several occasions.

There are hopes, Mr. Via said, of making the program an annual event.

VIETNAM

(Continued from page 1)

bridges, triggering 91 secondary explosions and destroying or damaging many enemy-occupied buildings and fortifications, plus transportation equipment.

Pilots like the simplicity of the F-5. One, Colonel Wiltz P. Segura, vice commander of the 3rd Tactical Fighter Wing of which the 10th FCS is a part, recently became the first pilot to fly the F-5 in combat without going through a special training school.

Command of the 10th FCS shifted recently to Lieutenant Colonel Robert F. Titus, a veteran combat pilot and former Air Force test pilot.

GEMINI: View From Bridge Was Red-Striped Canopy

(Continued from page 1)

Mission Control in Houston that the drogue parachute had deployed.

"Stafford confirms that the drogue chute has deployed," said Paul Haney, Manned Spacecraft Center Public Affairs officer. "One of the down range aircraft pilots is in communication with Gemini 9 . . . Thirty minutes since retro fire. We are coming up on main chute now. Gene Cernan now revised his estimate 3.3 miles long . . ."

"Thirty-one minutes since retro fire and since the wind is from the east, the betting here is that the easterly wind will float the spacecraft right back to the aiming point. We will see how that comes out."

The first official confirmation that the main Northrop Ventura parachute had deployed came when the picture appeared on television screens in the Mission Control Center at Houston. Communicators on the WASP were talking with Stafford and Cernan in the descending spacecraft and at the same time vectoring out the recovery helicopters and frogmen who would attach a flotation collar around the spacecraft moments after landing.

WASP: Gemini 9, this is Wasp, we have you directly ahead of the Wasp visually.

Stafford: Roger. Roger we got two points (shift to the two-point suspension of the landing system) and we are coming down. Give my congratulations to Captain Hartley for being on the spot.

WASP: Roger. Welcome aboard.

Stafford: Have you got us in sight?

WASP: Roger. Everybody on the flight deck has you about two miles ahead.

Stafford: Have you got us on TV . . .

WASP: Roger, you will be very shortly.

Stafford: Passing through 3000 feet.

WASP: Gemini 9, you are on TV.

Stafford: How about that. Tell Captain Hartley we would like to come aboard shortly in the spacecraft . . . Passing 900 feet.

WASP: Roger, this is Swim One and still have them in sight. The R and R section just hit the water. Roger, we get it. Swim Two is going in for R and R. (This refers to divers' attempts to recover the rendezvous and recovery canister which descends

by separate parachute when the main spacecraft parachute deploys.)

WASP: This is Swim One, splashdown, splashdown. (This at the moment the spacecraft touched the water.) It was a good one.

One Navy official commented that the spacecraft "didn't even make a very big splash." The huge parachute was visible to cameramen and television viewers as air spilled out and it settled toward the water. The captain of the WASP ordered other frogmen to recover it.

" . . . pick up that parachute, you can get there right quick. It is just down around the spacecraft."

Simultaneously, Stafford reported that the spacecraft was shipping water. "When we hit," he said, "we kind of sprung a bulkhead and we have a little water, and so as soon as you get here . . ."

WASP: Gemini 9, we are estimating 45 minutes until pick up.

Stafford: Well, okay, we are in good shape here.

An hour later, the two astronauts were aboard the Wasp and on their way back to the United States.

Space-age Hardware, Old West Merge at Conejo Valley Days

Space programs of the future were merged with a celebration of the Old West for four days this month when Northrop Ventura participated in the annual Conejo Valley Days.

Models of the Mercury Earth Landing System, a Cloverleaf parachute and the NV-105 (Chukar) drone were on display in a booth at the community event.

H. E. Riggins, assistant general manager and vice president, Administration, arranged for Northrop's participation in the fair, which also included a rodeo, a parade, a carnival and a barbecue dinner. It was held June 9 through 12.

Charles Merlian, chief of Division Policy and Organization, directed the preparation of the display, aided by Chuck Taylor of Technical Services and Bart Cook of Marketing.

Conejo Valley Days is held in a Moorpark shopping center each year to raise funds for the Conejo Valley Chamber of Commerce.

VENTURA ARTISTS SHOW THEIR TALENTS IN WATER COLORS, OILS AND INK



Paintings by (from left) Bill Casey, Julian Ralph and Doug Finch are among those which will be shown on June 29 to Northrop Ventura employees. The men are members of the Arts and Graphics branch.

NORTHROP NEWS

NORTHROP VENTURA

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July 6, 1966

Star Tracker Big Success On Trial Run

The first shipboard trial run prior to full scale acceptance tests of a sea-going star-tracking system was reported as "remarkably successful" by program engineers at Northrop Nortronics Needham (Massachusetts) department.

The system, capable of providing highly accurate celestial fixes to check the accuracy of the ship's inertial navigation system (SINS), will be used aboard five NASA tracking ships scheduled for service in the Apollo moon program.

In the trial run late last month, the marine star tracker achieved 103 daytime fixes on a catalog of 30 stars. Average magnitude of the stars was 2.6, which means the human eye would have a difficult time distinguishing them even at night, according to Jim Hart, program manager.

The Northrop system makes the celestial fixes possible in bright sunlight.

In addition to the system tested recently, two others have been delivered—one each to General Dynamics Electric Boat Division at Quincy, Massachusetts, and Ling Temco Vought at New Orleans, Louisiana. General Dynamics is under contract to build three of the highly specialized ships, and LTV is building two.

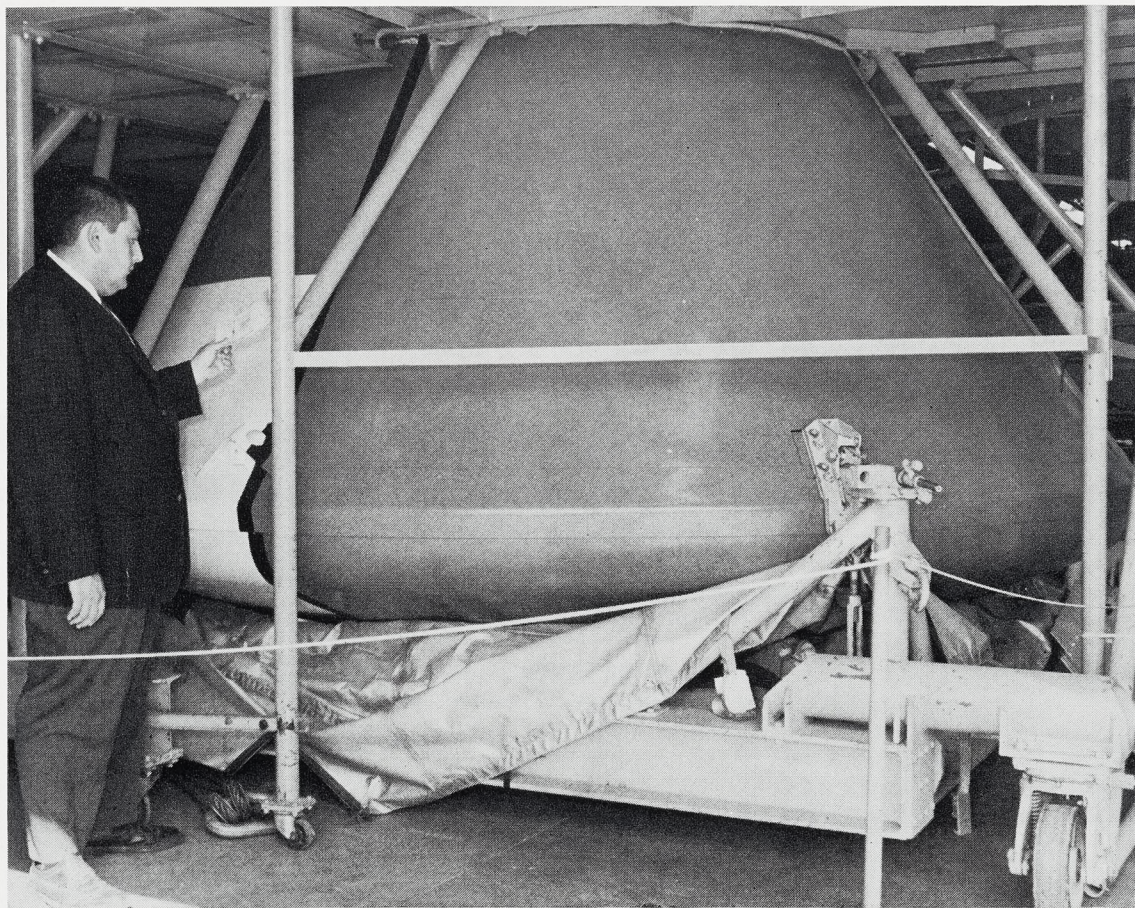
Nortronics departments in three different cities are contributing to the star-tracking system, with prime responsibility at Needham. The star sensor itself was developed and manufactured at Palos Verdes. Gyroscopes came from Precision Products department at Norwood, Massachusetts. Stabilization platform, gimbal structure, astrodome, and other associated equipment are manufactured at Needham.

The star tracker's function is to monitor and update the SINS outputs in position and heading.

An additional function of the star tracker, recently added to the program by NASA, is to calibrate radar system aboard the ships, according to Mike Kerpchar of Palos Verdes.

It will do this by taking a fix on a balloon, launched specifically for this purpose, and comparing its results with that of shipboard radar.

APOLLO WORK CONTINUES



Lou Florence, in charge of Apollo Logistics at Northrop Ventura, examines the Block II boilerplate. Work is continuing on the project, as workers install equipment to be

used in the testing of the spacecraft. Initial testing was scheduled to begin last week.

Mrs. Charles Bassett Voices Appreciation For Condolence Note

Jean Bassett, widow of Astronaut Charles Bassett, has written to George Douglas, Corporate vice president and Northrop Ventura general manager, thanking him — and Ventura employees — for a letter of condolence following Mr. Bassett's death.

Mr. Bassett, an Air Force captain, was killed in February in a plane crash in St. Louis.

"Peter, Karen and I want to thank you and all of the Northrop Ventura people for your letter of condolence following the airplane accident which took Charlie from us last February," Mrs. Bassett's letter said.

"Charlie spoke very highly of his visit with your employees last year, and he placed a great deal of confidence in the important work all of you are doing in support of the space program.

"We shall always be grateful for your thoughtful and encouraging remarks, and we hope you (See MRS. BASSETT, page 6)

NSL Space Geophysics Lab Probes Moon Composition

How do you determine the mineralogical composition of the moon, when no man has ever been there, or predict its internal constitution from very limited Apollo astronaut data?

How do you predict when and where an earthquake is going to occur — and reduce the ensuing destruction and loss of life?

These are but two of the problems being studied by scientists in the newly formed Space Geophysics Laboratory at Northrop Space Laboratories, headed by Dr. John D. Bledsoe.

Announcement of the formation of the Space Geophysics Lab was made by Dr. J. W. Moyer, director of Physical Sciences. At the same time, Dr. Moyer announced that the Space Physics and Chemistry Laboratory, headed by Dr. K. F. Sterrett, has been redesignated the Physical Chemistry Laboratory.

Analyzing the composition of

the moon is one of the four-man lab's current projects, under assignment from the National Aeronautics and Space Administration's office of Advanced Research Technology (OART).

"Since we can't be certain of the actual composition of the lunar surface or its core," Dr. Bledsoe said, "we work with different types of substances which may approximate the lunar conditions — serpentine, basalt, granodiorite, olivine, and chondrites."

In connection with this project, the scientists use Northrop's specialized high pressure-high temperature laboratory (680,000 pounds per square inch at 3600 degrees Fahrenheit) to recreate probable conditions at the moon's core, or deep within the earth's mantle.

Under proposal to NASA is a program to analyze the actual composition of the lunar materials, when Apollo reaches the moon, and astronauts return with actual lunar samples.

"Under that program," Dr. Bledsoe said, "we would analyze the samples to correlate the physical properties with seismic characteristics."

Testing the seismic (acoustic) velocity of a material, Dr. Bledsoe explained, "determines the elastic properties of the rock. It is the only method we have to study the deep interior of the earth or the moon.

"Seismic waves also are used for commercial prospecting for oil or minerals and can be used to locate subsurface layers of rock formation.

New Century Successful In Drop Test

The largest parachute ever built by Northrop Corporation has been tested successfully, giving new impetus to the Century Project at Ventura.

A 128.8-foot Ringsail parachute was dropped from 15,000 feet at El Centro last month, carrying a 9500-pound test vehicle to a steady descent on the desert sands.

It was tested at its ultimate design condition of above 96 pounds per square foot.



Mr. Vickers

The decision was made in March to redesign the Century, using a modified one-quarter spherical configuration, which was successfully employed in NASA's Mercury and Gemini manned space programs. The parachute, of medium weight fabric design, was completed in May.

A parachute of identical design but utilizing lightweight fabrics was built last month and will be tested late this month, using the same dynamic conditions. The tests are being conducted under contract to NASA and the Air Force.

"The test of the new Century was most encouraging," according to Jack. "And it gives us data which is extremely important in the development of larger and more efficient Ringsails."

Mr. Vickers was named program manager and project engineer in April.

"Actually, the development of larger parachutes is extremely important. The weight of space- (See CENTURY, page 6)

R. J. Dickman Assumes DOD Contract Duties

Raymond J. Dickman has been assigned as the Department of Defense administrative contracting officer serving Northrop Ventura.

He replaces Lyle Finley, who has been assigned to contractors in the Santa Barbara area.

Mr. Dickman thus becomes the DOD contracting officer for military contracts being fulfilled by Northrop Ventura. He also represents the Department of Defense to more than 30 other contractors and suppliers in the San Fernando Valley and Conejo Valley.

Administrative contracting officers represent all branches of the Armed Forces. Until last December, each branch had a separate representative.

Mr. Dickman's headquarters is the Defense Contract Administration Services District office in Van Nuys.

OUTCOME IN DOUBT WHEN

Fishermen, Marlin Tangle in Tug-O-War

What happens when you tie a line to 180 pounds of fighting fish, hold on to the other end of the line and pull—does the fish win, or do you?

Three Northrop Ventura fishermen tried the experiment in the Sea of Cortez off the tip of Baja California during a recent weekend.

Each decided that the man vs. fish battle is pretty evenly matched, and that "in another five minutes, the fish would have had me."

George P. Champion, Douglas B. Finch and John P. Steman flew to Bahia de Palmas, below La Paz, in a private plane piloted by Jack L. Calder. They were most fortunate in obtaining the use of a 600 h.p. Chris Craft cruiser

(See photo on page 6)

which Bing Crosby had recently sold to Bill Curry, an American who operates a number of cotton and wheat ranches near La Paz. Mr. Curry went along on the cruise, since "My hobby is pho-

tographing fighting marlin." And he got plenty of good action footage during the day's fishing.

The fearless foursome who call themselves the "Baja Blacksheep," recommend the flight to all sportsmen.

Cabo San Lucas is on the southernmost tip of Baja. "From that point south, there is nothing but blue water until you reach Antarctica," said the Mexican territorial officer at the Cape. The foursome took his word for it and turned back north.

FRINGE BENEFITS

Employees' Savings Plans: Changes May Be Authorized Now



By WILLIAM LARRABEE
Vice President—Industrial Relations

Getting back from vacation is something like diving into cold water—the shock is terrific at first but after one has been in awhile it doesn't feel so bad. The first thing that a person does, of course, is to tell everybody about his trip and then get back to work.

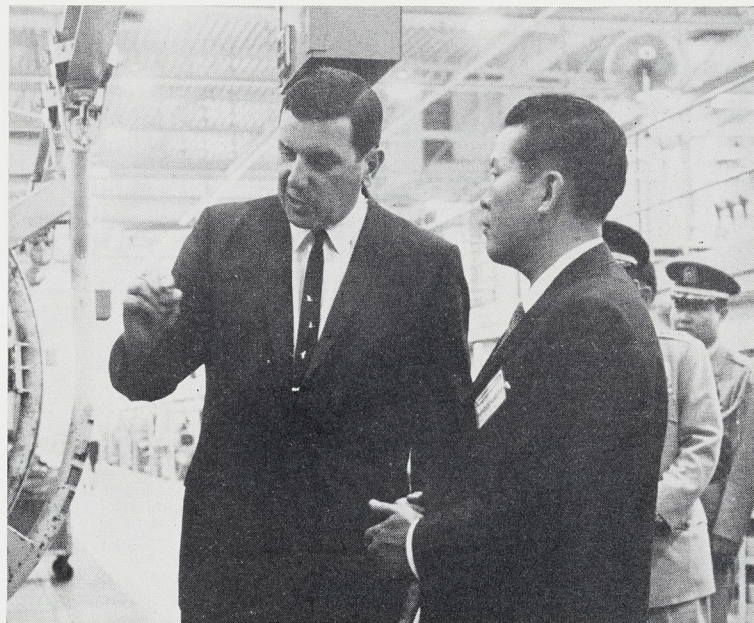
In going through all of the letters and reports and memoranda in my desk, I found that some very nice things had happened while I was away. One of the first items on top of the pile was the Savings Plan Participation Report. It was very interesting to see that every segment of the Corporation showed an increase in participation in the Salaried Employees' Savings Plan since the last quarterly report. Out here on the West Coast approximately 85 percent of our eligible salaried people are in the plan.

Everyone should know by now, of course, about the big change in the Salaried Employees' Savings Plan which becomes effective at the beginning of the first pay period on or after next August 1. At that time the company is going to permit us to increase our savings to the nearest whole dollar amount that is not more than eight percent of our salaries with a 50 percent company matching, provided we have been in the plan continuously for three years as of that time. There is one very important thing to remember about this change. Most people who will be eligible by the start date must sign up for the increased payroll deduction by July 15 or they will miss a whole three months of the increased deduction. Their deductions will start August 1. Eligible people on the Norair and Corporate office payrolls can sign up as late as July 22 since their deductions cannot start until the payroll period beginning August 7. Cards can be obtained from any Industrial Relations

office and they have been sent around to some locations which are not handy to Industrial Relations offices. People who have not picked up a card by now and turned it in, and who want the increased deduction, should move right away to get the card signed and on file. Personnel who will not have completed their three-year eligibility period by the August start date should contact their Industrial Relations office at least one month before the time they become eligible for information as to how they can increase their contributions.

The brand-new Hourly Employees' Savings Plan is also showing some good results. Participation increased in every segment of the company during the last quarter. There are now well over 4000 of our hourly-rated people in the plan and the numbers are getting higher every day. Now is a good time for any hourly people to sign up who wish to do so since by getting their cards in by July 15 (July 22 at Norair and the Corporate office) their payroll deductions can start as of the first pay period in August.

Another very pleasant thing which showed up in the mail was a completely unexpected reaction to the Northrop News article on our grievance procedure. We all knew that we had something pretty unique when an employee can go up in steps through supervision to top management with his problem and then have outside arbitration if he so desires, all at company expense. Once the article came out, however, letters began arriving from all over the United States asking for copies and how the procedure worked. Requests came from such places as Connecticut, New York, Ohio, Iowa, Nebraska, (See FRINGE BENEFITS, page 5)



NORAIL PRODUCTION LINE—Welko E. Gasich (left), Norair vice president and assistant general manager-Technical, shows the F-5 production line to General Kim Sung Eun of the Republic of Korea. General Kim and several aides toured Norair last week.

Northrop Hosts Korean Minister of Defense

The Republic of Korea's minister of defense, General Kim Sung Eun, visited Northrop Norair last week and inspected the assembly of F-5's.

Korea is one of 12 Allied nations obtaining the Northrop-built tactical fighter, including the United States, which is using them in Vietnam. The first squadron of F-5's was turned over to the ROK Air Force in April 1965.

General Kim and four other Korean officials, accompanied by a U.S. Army escort officer, met with Thomas V. Jones, president and chairman of Northrop Corporation.

They then attended a briefing on the use of the F-5 by Free World nations (others already equipped with the jet fighter are Norway, Greece, Iran, the Republic of the Philippines, the Republic of China, Ethiopia, Turkey and Thailand, while Canada and Spain are scheduled to get the F-5 under licensing agreement).

Following lunch with Northrop officials in the Northrop Space Laboratories executive dining room, the officers inspected the Norail production line, where the F-5's are assembled.

NORTHROP PERSONNEL DISCOVER

Huntsville Is An Ideal Spot for Leisure Activities

If in every person there is a story, then there are 140,000 stories in Huntsville, Alabama—the melting pot of the South. And Northrop Space Laboratories has 250 of them.

In contrast to the "naked cities" in other parts of the country, Huntsville, Alabama, is a unique city in which all the major corporations are united in a common industry, income is above average and taxes are below average, and there is an outlet through which most any person's outside interests can be cultivated.

"An aura of excitement prevails in the city day to day as its 140,000 inhabitants are caught up either directly or indirectly in an atmosphere of progress created by the nation's space programs," says Walker Bennett, director of Administration for NSL's Huntsville department, who recently moved to Huntsville from Northrop Ventura's Newbury Park facility.

In 1950, when the Army moved its missile and rocket headquarters to Redstone Arsenal, near Huntsville, the city was the cotton and watercress center of the State. By the end of 1962, only 15 percent of the population were natives of the city.

The NSL department now employs 314 persons, including 63 at Cape Kennedy.

More than a score of NSL's engineers, scientists and mathematicians at Huntsville were born outside the United States, mainly Republic of China and India. Boasting an unusually high academic level, the department employs 169 college graduates, including 28 with doctorate's and 36 with master's degrees.

What do 250 well educated, space-oriented people do in a city that 15 years ago was a weekend shopping

center for farmers.

In the field of music, Danny Liu, an engineer of Chinese origin, is an accomplished violinist and plays in numerous string ensembles at church and civic activities. Warner Harris of Program Management has been a jazz pianist for 21 years and plays for clubs and Northrop parties.

In sports, Ron Radhoff, Tech Data and Graphic Services supervisor, with 4½ years experience and 600 jumps, is an experienced sport parachutist and instructor. He served two years as president of the Huntsville Sport Parachute Club and chairman of the Cottonbelt Parachute Council.

He was the 1964 Style Champion of the Southern Conference and has been two years Style Champion of the Cottonbelt Parachute Council. He has competed in some 17 parachute meets in the past two years, winning 21 awards. Ron was a principal judge in the National Parachuting championships last month at Tahlequah, Oklahoma.



Ron Radhoff falls over Alabama

EDITOR'S NOTE: This is the second of four articles on the Huntsville department of Northrop Space Laboratories. The first (March 16) discussed the history and locale. This article tells about some of the employees. The final two will cover programs and technical accomplishments and the department's activities at Cape Kennedy. An article is also in preparation on support operations for the Nike-X program at Huntsville, which is handled by a separate NSL department.

Malcom Mackenzie, engineer, part owner of five airplanes, is a commercial flight instructor with five Northrop employees as students. Having recently purchased an orange grove near Palm Beach, Florida, he flies to Florida approximately every six weeks. Dall Shady, member of the Technical staff, is also a commercial flight instructor of 26 years and has been a flight instructor for the Redstone Flying Club for five years. He also has taught several Northrop co-workers.

Bill Pierce, designer, has taken up scuba diving, mainly in the Panama City, Florida area, about a 7-hour drive from Huntsville. He is using this talent at Northrop to help run neutral buoyancy tests to simulate zero gravity.

Al Merville, mathematician, and Mike

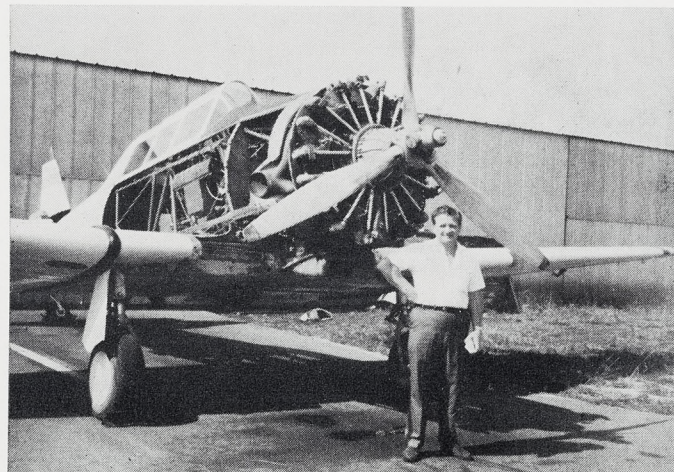
Thompson, engineer, have an avid interest in cave exploring and explore mostly in North Alabama. Mike seems to have an affection for bats, as he often takes them home in Band Aid boxes for temporary pets.

In the handicrafts field, Ted B. Taylor, Plans and Programs, relaxes constructively at woodworking. He has made almost all the furniture in his home, including a king-size bed with an adjustable, upholstered headboard for reading in bed.

When asked how he began this hobby, he declared, "It was the only way I could get furniture to fit me." (Ted is 6'4½".)

June Lucas, secretary, specializes in ceramics. The cleaning and painting is

(See HUNTSVILLE, page 3)



Dall Shady restores old aircraft

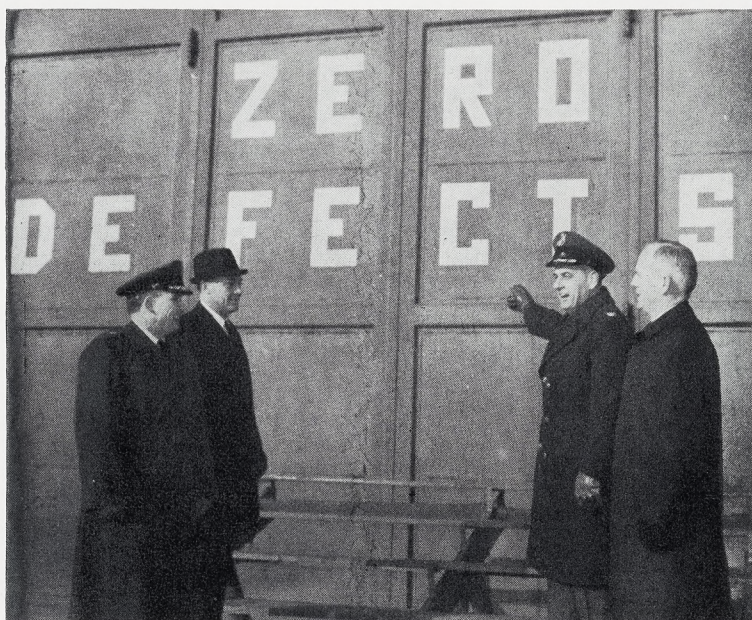
Fortnight in Review



Northrop Ventura daughters, Diane Ewing (left) and Suzanne Capelli, are winners of Ventura Management Club-sponsored scholarships in the amounts of \$750 and \$250 respectively.



Gwynn H. Robinson (right), Northrop Corporation vice president and manager of European Operations, was recently promoted to the rank of brigadier general in the Air Force Reserve. He receives stars from Major General Carroll W. McColpin, commander of the Fourth Air Force Headquarters at Hamilton Air Force Base, California.



Northrop International's Clay Tice (right) found Zero Defects movement is world-wide when he was guest of Air Force's 49th Tactical Wing's silver anniversary observance in Germany recently. Mr. Tice commanded the Wing in the Pacific during World War II.

NDP Plans Computer Orientation Series For New Employees

Northrop Data Processing (NDP) is formulating plans for a special three-hour orientation of all newly employed technical, engineering and scientific personnel who may be required to use NDP's general-purpose computer systems during the course of their assignments.

The program is now being coordinated with all divisional training and personnel offices; they will be the ones to identify and assign potential computer users to the NDP familiarization seminar. The first session is scheduled for August. Thereafter, the orientations will take place the first Tuesday of each month in Plant Two and the Computing Operations Center in the Engineering and Science Center.

Tak Yamashita, NDP director of Programming, indicated that these sessions are designed primarily to help the future computer user through early familiarization with the data processing services and equipment types available to him.

"Past experience suggests the need for an orientation of this nature so as to minimize possible lost time later on, on the part of technical personnel," Mr. Yamashita said.

Mr. Yamashita explained that the proper understanding and interpretation of standard practices and procedures, the way a data processing job is handled and the correct use of forms — all contributed to a user's efficiency later in his career.



Colonel Theodore Coberly, USAF, (right) has been re-assigned after heading tri-service TIPI (Tactical Information Processing and Interpretation) program. He visited Nortronics prior to his departure and here chats with Frederick Stevens, Northrop vice president and Nortronics general manager. Nortronics is providing systems engineering and technical direction for TIPI program.



A Northrop Nortronics technician holds a unique "floated" inertial measurement unit which provides precise attitude information for aircraft navigation. The ball section is supported within a spherical platform by an extremely thin layer of fluid, allowing it to rotate freely to provide accurate pitch, roll and azimuth data regardless of aircraft movement. Conventional inertial platforms use mechanical instead of fluid supports. The concept will be applied to the navigation system being developed by Nortronics for the giant Lockheed-Air Force C-5A transport.

HUNTSVILLE: An Aura of Excitement, an Atmosphere of Progress

(Continued from page 2)

done at home, but the molding and firing at Hazelhurst Ceramics. Her most elaborate product was a complete chess set for her husband.

Mr. Bennett is making an outstanding contribution to a completely different field. For two weeks in July, he will be the only U.S. layman representative from the Lutheran Church to the World Council of Churches in Geneva, Switzerland. He is one of 56 representatives chosen from all the U.S. Protestant churches. There will be a total of 400 delegates from Asia, Africa, North and South America, and Europe.

For all Northrop employees there is much to do in Huntsville, and increasingly so as the city catches up with the population explosion. Clubs such as the Amateur Radio, Antique Automobile, Rifle, Boat and Yacht, Chess, Flying and innumerable others, thrive.

Huntsville is a city in which culture — art, music, drama and the dance — is important to citizens. Activities in these fields are numerous, both professional and amateur. There are three community theater groups and a series of Broadway plays booked each season by the Broadway Theater League. Huntsville has its own civic symphony, chorus,

youth orchestra, chamber music guild, art league, ballet association, and several other organizations, and brings first-rate entertainers to the city frequently.

Many NSL employees are taking advantage of outstanding educational opportunities. Local facilities include the Huntsville Campus of the University of Alabama which offers four-year undergraduate instruction leading to degrees in mathematics, physics, English and history; the University of Alabama Research Institute; the Oakwood (Junior) College; and the Alabama Agricultural and Mechanical College.

An expansion and planning program is well established to allow an orderly growth and provide adequate services in all areas. The Heart of Huntsville Plan (for a new city complex) is a large redevelopment program under way, involving construction of a new municipal building, courthouse, library, auditorium, arts center and community park areas.

In spite of the amount of money being expended on the development of Huntsville, the per capita state and local taxes are the lowest in the Southeast, 40 percent lower than the U.S. average, and less than one-half that of California.

AD ASTRA PER ASPERA

Landing Systems Win Recognition

Long past are the days when parachutes were simply stitched umbrellas of silk, strapped to the back of an aviator as he bailed out of a stricken airplane.

And, just as the science of aerodynamics has progressed, so has the related — but nonetheless distinct — science of landing systems.

The foremost step in the recognition of aerodynamic deceleration as a science in the scientific community has been the recent establishment of a committee by the American Institute of Aeronautics and Astronautics.

The AIAA calls it the Aerodynamic Deceleration Systems Committee, but Northrop Ventura's Theo Knacke, who will become chairman of the group next year, calls it the culmination of a seven-year battle for greater recognition for recovery and landing systems.

Mr. Knacke, who will begin a two-year term as chairman in January, believes recent recognition of landing and recovery systems will do much to advance the state-of-the-art.

"Recovery and landing systems have been a sort of stepchild for a long time," Mr. Knacke said.

"Some people even linked parachute systems more with the textile industry than with space systems. But now with the establishment of the committee, the science of recovery systems will gain long needed recognition.

"We had been trying since about 1959 to have landing systems recognized as a science of its own. This will mean more support, more applied research, more funds and more emphasis in general, and increased emphasis and attention will bring about greater progress in the field," Mr. Knacke said.

He believes that it was General Bernard Schriever who said, "Engineers tend to overestimate what they can do in two years, but underestimate what they can do in twenty years."

The same is true in the aerodynamic deceleration area.

"We once made a long range estimate in our planning on supersonic parachute systems, and we estimated far short of our results."

Working closely with Mr. Knacke in the formation of the committee were Northrop Ventura's W. H. Freeman, responsible for aerospace industry; Earl C. Myers, technical director of the Air Force 6511th Parachute Test Group at El Centro, responsible for military organizations; and Dr. Helmut Heinrich of the University of Minnesota. Dr. Heinrich was in charge of stimulating university interest in the proposed group. The work of these individuals resulted in AIAA authorization two years ago at the group's annual meeting in Dallas to form a decelerator committee.

Mr. Myers was elected the new group's first chairman, and Mr. Knacke will succeed him.

Northrop Ventura will present three technical papers at the first national AIAA symposium on Aerodynamic Deceleration Systems on September 7 through 9 in Houston, Texas.

The papers are:

"A Method of Load Prediction for Parachutes in Clusters", by John H. Moeller.

"Parametric Analyses of Parachute Landing Systems for Planetary Missions", by Phillip R. DeLurgio and Robert N. Worth.

"The Skirt Jet Attenuation System," by Edgar G. Ewing and George Frank.

Included in the three-day program will be a visit through the National Aeronautics and Space Administration (NASA) Manned Flight Space Center.

Mr. Knacke will be chairman of a Systems symposium at the convention.

Other programs at the meeting will be held on recovery fundamentals, landing systems components and tests.

Mr. Knacke, co-inventor of the ribbon parachute, has worked in deceleration systems since 1935, when he began wind tunnel tests on parachutes for Germany's Heinkel Aircraft Company.

"More work is needed in our field," Mr. Knacke said. "Landing systems aren't even taught in colleges or universities, except for a few courses at the University of Minnesota."

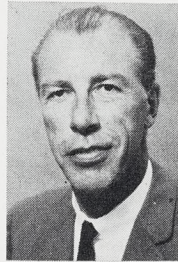
"This means work in the field is done primarily in private industry and government laboratories, and not sufficiently in the schools, from which we could attract young scientists already interested in deceleration systems."

* * *

Accountants Select Lancot

Senior accountant Ward E. Lancot of Northrop Ventura has been installed as vice president of the San Fernando Valley Chapter of the National Association of Accountants.

Mr. Lancot took office recently at a banquet in Panorama City.



Mr. Lancot

He has been a member of the NAA since 1945, and has been active in the Valley Chapter since it was formed three years ago. In 1964 and 1965, he was treasurer, and has been director of chapter competition for the past year.

Mr. Lancot has been with Northrop for three years.

Also installed, as director of programs, was Dan Cashier, group administrator general accounting, Northrop Ventura.

Twenty Northrop men belong to the 338-member chapter, including six from Ventura, seven from Nortronics (including four from NARD), two from Norair, four from Corporate offices, and one from Northrop Architectural Systems.

* * *

People in the News

Presented at the AIAA's second Propulsion Joint Specialist Conference June 13-17 at Colorado Springs were four papers by members of Northrop Norair's Research and Technology section. Development of a hybrid hot gas pressurization system was W. F. Keller's topic; wind tunnel investigations of VTOL lift engine inlet was discussed by R. Lavi; A. Feder and J. A. Bogdanovic presented studies on a rocket expulsion system design; and multiple rocket engine exhaust plumes was the subject for Chong-Wei Chu, A. F. Niemann, jr., and S. A. Powers.

D. P. Wilhelm discussed his investigations of cyclic crack growth transitional behavior at the ASTM Crack Propagation Symposium last week. R. E. Herfert, engineering specialist in the Materials Research group recently served as a judge for the Physics division of the Sixth Annual Science Symposium held at South Hills High School, Covina. The symposium is designed to give high school students an opportunity to prepare and present research papers.



COUNSELORS GET INSIDE VIEW—Participants in a "Plans For Progress" Vocational Guidance Institute toured Norair recently as part of day-long program which included talks on equal opportunity employment practices. Roland B. Scott (right) was tour guide.

'Plans' Guidance Institute Draws Northrop Support

Northrop Corporation's continuing support of "Plans For Progress" program concepts is reflected in a special Vocational Guidance Institute holding its final sessions this week in Los Angeles.

Fifty selected junior and senior high school counselors are attending the three-week institute held at the University of California Extension Downtown Center and co-sponsored by the Extension and "Plans For Progress."

Northrop and other "Plans

For Progress" firms in the area are helping defray costs of conducting the Institute. And 30 of these firms, including Northrop, who embrace Equal Opportunity employment practices are opening their doors for plant tours and special discussion sessions.

Seven institute participants visited Northrop Norair June 23 for a plant tour and open discussions of such topics as employment policies, job opportunities, entry requirements for various job classifications.

Northrop participants in the discussions included Bob Catlin, Lyle Cripe, Larry Littrell, Jerry Lentz, John Chambers and Roland B. Scott.

This is the second institute staged in the Los Angeles area.

Last year William Larrabee, Northrop vice president-Industrial Relations, spearheaded a move which led to industry-wide support of the program.

Basically, the Institute program is designed to enhance the counselors' understanding of the attitudes which "culturally deprived" youths have toward such matters as employment, education, family life, their place in society and the world beyond their experience. Through discussions with Northrop businessmen and others taking part in the program, educators and governmental officials, the counselors will better understand opportunities available to youth who are being adequately prepared for adulthood.

Beverly Hills Chamber Seats William Larrabee

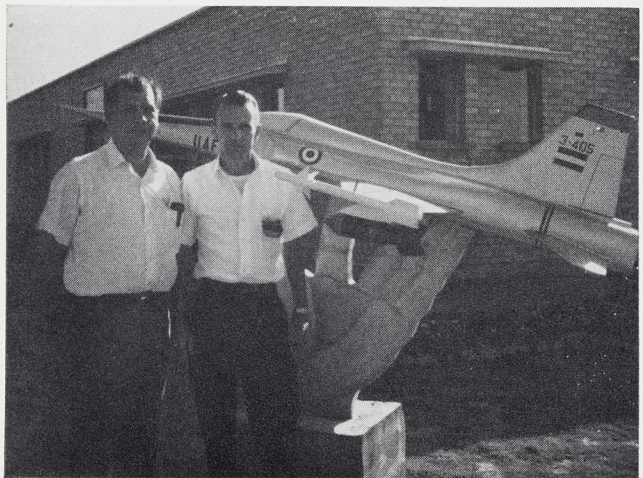
William Larrabee, Northrop vice president, Industrial Relations, was installed recently as the 45th president of the Beverly Hills Chamber of Commerce.

He was inducted for a one year term by retiring president Jack Matthes, manager of west coast operations for Saks Fifth Avenue, in ceremonies at the Beverly Hills Hotel.

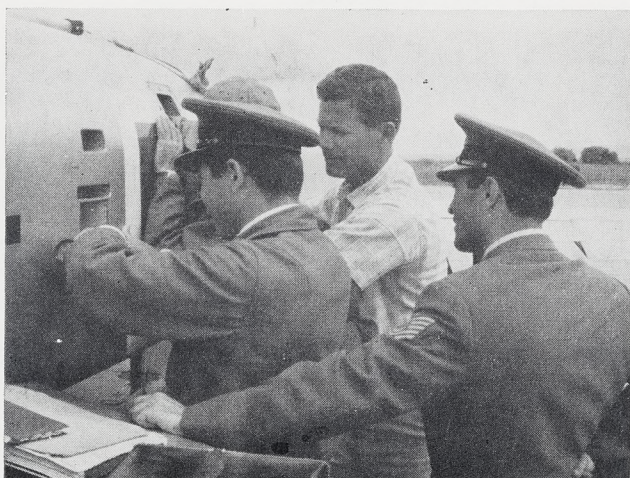
Other officers installed were Warren F. Ackerman, first vice president; David B. Heyler, sr., second vice president; S. Laub, treasurer; J. "Bert" Edwards, executive vice president and secretary. Richard Friel, newly appointed manager of the Beverly Hills Chamber, was introduced at the event.

Ten past presidents of the chamber were among those attending the annual event.

SPOTLIGHTING INTERESTING PEOPLE AROUND THE WORLD



Norair Tech Reps J. M. Blair and A. H. Brown stand before unusual F-5 model (left), fashioned of sheet steel and mounted on hand pedestal by Iranian Air Force personnel. Bill Shuck and uniformed Turkish Air Force maintenancemen (center) perform foreign object damage inspection on F-5 at



Bandirma Air Base, Turkey. A1C John G. Hooker and S/Sgt. Dennis A. Christensen (right) stand before F-5 they have sent on more than 36 combat sorties in Vietnam without operational discrepancy being written against it.



Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

For Sale

Corvair 700, 1961, 4-dr. sedan, 4-spd., std. 6-cyl., r/h, good tires, 1-owner, \$595. L. A., 645-8278. A

Welding Equipment, 2-stage regulators, hose, Victor torch & tips, \$65; w/55 cu. ft. tanks & cart, \$115. Inglewood, 677-6204. A

Trombone, Olds Special, recently replated & aligned, \$100. Downey, TO 9-7410. A

House, Spanish stucco, 2-bdrm., 63 x 120 lot, zoned 5R, near Northrop, \$25,000. Inglewood, OR 1-1254. A

House Trailer, 1961, 50' x 10', alum. awning & steps, Pan Amer. penthouse, bank will finance 70%, \$3800. Gardena, DA 4-2133. A

Drums, 4 w/cymbal, high hat & stool, \$150. L.A., PL 6-6302. A

Dining Room Table, 36" x 44", w/2 leaves, 6 chairs, mahogany, \$35. Inglewood, PL 4-8077. A

Ford, 1949, 2-dr., V-8, r/h, trailer hitch, \$285. Inglewood, OR 7-7421. A

Volkswagen, 1965, sunroof, radio, shoulder straps, \$1549. Torrance, 371-9730. A

Falcon Ranchero, 1960, 3-spd. standard shift, \$550. Gardena, DA 9-9046. A

Chevrolet, 1956 station wagon, 2-dr., stick shift, 6-cyl., simulated wire wheels, comp. steering, new paint, r/h, \$325. Hawthorne, 679-1924. A

DeSoto, 1958, 4-dr. h/top, p/b, p/s, p/w, w/s/w, orig. owner, \$250. L.A., 754-4098. A

Guns, rifles & pistols w/ammo, approx. \$650 in firearms, \$150 in ammo., \$600. Torrance, 378-3219. A

Motor Bike, 3-wheel, 2-spd. trans., \$35. Redondo Bch., FR 5-0747. A

Mustang, 1965, 4-spd., 4-barrel carb. V-8, 289 cu. in., p/s, b/seats, chrome rims, \$2000. Cypress, 714-827-7189. A

Washer, 1960 custom Imperial Frigidaire, auto., \$20. Long Bch., 633-5938. A

Love Seat, maple, rocker-type, \$20. Torrance, 370-6734. A

Piano, Shoninger upright, dk. wood, \$100., Garden Grove, 714-528-8582. A

Rug, oval, wool hooked, approx. 9' x 12', predominantly green, \$40. Fullerton, 714-526-1521. A

Range, gas, O'Keefe & Merritt, 36" model, griddle, timer, \$35. Torrance, DA 3-9887. A

VW Bumpers, front or rear, no rust, \$16. Huntington Bch., 714-897-8201. A

Refrigerator, Philco, 5' high, \$35. Manhattan Bch., 379-6762. A

Range, Tappan 400 elec., all access. & 2 ovens, bronze, take over \$17.85 pymts. for 20 mos., \$357. Box 1301. A

Sewing Machine, Adler portable, w/all attachments, \$100. Hawthorne, 675-8721. A

Alfa Romeo, 1964, 2600 Spyder, disc brakes, 5-forward, new Pirelli's & tools, \$2895. Lynwood, 635-3784. A

Guinea Pigs, 1 female, 1 male, cage & food, \$5. Gardena, 324-5391. A

Guitar Amplifier, Gibson Titan III, 1-yr-old, cost \$700; \$425. P. V. Pen., 377-7670. A

Renault Dauphine, 1959, low mileage, new tires, \$195. Gardena, FA 1-4621. A

Chevrolet, 1966 Impala sport coupe, w/s/w, r/h, air cond., low mileage, 327 eng., \$2895. Inglewood, 674-9390. A

Ford, 1957 Fairlane, V-8, radio, \$300. Hawthorne, 644-3501. A

Ford, 1963 Galaxie 4-dr. 500 series, \$1295. L.A., 294-6403. A

Machinist Chest, Kennedy kit, \$25. Lawndale, 679-0876. A

Boat, Jefferies T. S. Express cabin cruiser, 26' x 10', sleeps 4, galley, dinette, new aft & side covers, V-dinghy, oars, 3 h.p. Evinrude, \$8900. San Pedro, FR 2-6585. A

Volkswagen, 1966 Squareback sedan, 10,000 miles, s/belts, special equip. tray, \$2150. Inglewood, PL 4-5358. A

Mobile Home, 1963, Kit Trojan 10' x 55', 2-bdrm., front kitchen, paneling, Tappan bltins, cooler, partially furn., \$3900. Hermosa Bch., FR 2-3381. A

House, corner, 3-bdrm., 2-car dble. gar., landscaped, patio, fenced, \$18,500. Norwalk, 864-7376. A

Bicycle Parts, 5 frames, 10 forks 20 wheels, tires, tubes & misc. parts, \$10. Inglewood, PL 5-4497. A

Dot Scrambler, 1964, excel. dirt bike, \$450. Lomita, DA 5-3494. A

Watch, lifetime guaranteed, 25-jewel Waltham, man's, in orig. box, retails \$110; \$89. Box 1302. A

Camper, 1959, 34-ton Ford, air cond., 10' cabover, gas refer., many extras, \$1895. Gardena, DA 4-2587. A

Volkswagen, 1960 sedan, 1-owner, low mileage, \$875. Rolling Hills, FR 8-2367. A

Tool Box, Kennedy, 7 drawers, \$10. Hawthorne, 675-9681 days. A

Mink Coat, autumn haze, finger-tip length, near new, fit sizes 8, 10 & 12, \$650. Culver City, EX 1-7673. A

Car Cooler, Bonair, 12 volts, \$20. Torrance, 371-5916. A

Falcon Futura, 1962, 2-dr., auto. trans., 6-cyl., r/h, b/seats, take over \$59 mo. pymnts., \$1200. Long Bch., 430-4349. A

Chevy II, 1963 Nova wagon, auto., p/s, p/b, r/h, lug. rack, s/belts, rear speaker, new shocks, \$1475. Torrance, FR 1-1096. A

For Sale

Ford, 1956, 2-dr., Victoria, V-8, auto., r/h, good tires, \$125. Lawndale, OS 6-6726. A

MGTD, 1951, completely restored, \$695. Anaheim, 527-3451. A

Desk Ensemble, modern, 3 sections, orange & white, approx. 9' long, \$65. Inglewood, 672-7424. A

Fountainette, beverage dispenser, \$85. Torrance, 835-5708. A

Lens, Nikkor wide angle, 28mm, 3.5 for Nikon F camera, never used, cost \$179.95; \$105. Box 1303. A

Skeet, 26" Charles Daly, O/U 12 ga., improved, recoil pad, trigger shoe, \$200. Hawthorne, 676-4251. A

Bathroom Sink, complete w/faucet & drain, \$15. Box 1304. A

Kittens, Siamese, 9 wks. old, house broken, purebreds, \$15 ea. Inglewood, 677-7224. A

Own-Your-Own Apt., 1-bdrm., upstairs, bltins, heated pool, 1 block from stores & transportation, \$16,950. Inglewood, OR 4-7743. A

House, 2-bdrm., dble. gar., sundeck, lge. lot, near beach, G.I. loan, \$23,500. Manhattan Bch., FR 6-6848. A

House, 3-bdrm., family rm., 2-bath, sep. dining rm., 2250 sq. ft., 6 yrs., 2/3 acre, stable & corral, fully landscaped, sprinklers, \$48,000. Thousand Oaks, 805-498-3901. A

Refrigerator, Crosley Shelvador, white, \$45. Torrance, DA 3-8747. A

Renault R-8, 1963 white, good cond., \$625. Buena Pk., 522-4939. A

Washer-Dryer, GE comb., less than 2 yrs. old, \$150. Rolling Hills Estds., 377-3244. A

Fiat, 1200 Spyder, 1960, excel. mileage, \$550. Hollywood Riviera, 375-1456. A

Stove, elec., 2 burner, \$10. L. A., GR 2-3374. A

Amateur Equipment, Gonset G76B transceiver, all bands ac & 12 dc power supplies, \$190. Panorama City, 894-3244. A

TV, color 21", Emerson 1964, console, \$350. Inglewood, OR 3-2840. A

Camera, Polaroid, J-66 model w/case, used little, cost \$120; \$50. Hawthorne, OS 9-6334. A

Surfboard, Bing, slight nose damage, repair kit incld., \$40. Hawthorne, 644-2592. A

Den Furniture, coffee table & 2 end tables, \$15. Hawthorne, 675-0407. A

House, 3-bdrm., close to Peninsula shopping center, \$245 mo. lease or \$30,800. P. V. Pen., FR 8-5475. A

House, 5-bdrm., 1-level, family rm., all bltins, lge. patio, landscaped, fruit trees, 2273 sq. ft., 2-car gar., 5 minutes to Nortronics P. V., \$49,950. P. V. Pen., 377-5319. A

House, 3-bdrm., 1 1/4 bath, covered patio, sprinklers, other extras, 2 blocks from El Camino, 10% dn., \$25,600. Gardena, 329-5082. A

House, 3-bdrm., 2-bath, dining area, lge. front rm., driftwood stone fireplace, rec. painted & carpeted, 4 blocks from elementary school, \$265 mo. lease or \$38,750. Redondo Bch., FR 5-3521. A

Stereo Hi-Fi, tape recorder, Berlant 33 broadcast, 2 Eico HF60 60 watts amps., Eico HF91 FM tuner, Eico HF 85 stereo preamp, many access., orig. cost \$2064; \$600 or sell sep. East View, TE 3-4153. A

House, 3-bdrm., bltins, bltin TV/Hi-Fi area, raised fireplace, 500 sq. ft. playrm.-workshop, 2 1/2 car gar., fruit trees, walking dist. to shops, 20% dn., \$26,000. Alhambra, AT 4-5698. A

Apt, duplex, 1-bdrm. ea., R-3 zone, room to build, \$17,500. So. Gate, 695-7497. A

Surfboard, Jacobs, 9'4", \$60. Torrance, 379-7165. A

Swimming Pool Filter, Romar, 1 1/4 h.p. Cartridge type, 1100 gal. hr. circulation rate, 2 yrs. old, \$20. Torrance, 323-4257. A

Console, Hi-Fi, Dynaphone radio-phonograph-microphone-amplifier, excel. for elec. guitar, \$60. Hawthorne, 676-0418. A

Dining Table, Duncan Phyfe, mahogany, w/4 chairs, table pads, extra leaves, \$35. Hermosa Bch., 374-5425. A

Camper for stepside Chev. pickup, 1 1/2 ton, \$50. Redondo Bch., FR 2-5310. A

Chrysler New Yorker, 1965, 4-dr. h/top, full power, air cond., auto., 9500 act. miles, orig. cost, \$4750; \$200 equity & take over \$117 mo. pymts., \$3411 bal. Buena Pk., TA 7-1352. A

Cemetery Lots, 2 dble. interment, Inglewood Cemetery, Parkview section, \$1200. Gardena, 329-5637. A

Range, Hotpoint deluxe, 36" elec., 4-burners, dble. oven, \$100. Anaheim, 524-1728. A

Movie Camera, 8mm, Mansfield Holiday auto., zoom lens, light meter, pistol grip, leather carrying case & tripod in case, used 3 times, \$60. Box 1305. A

Refrigerator, Frostless, 1-yr.-old, 13.6 cu. ft., \$150. Hawthorne, OS 6-3912. A

Stereo Speakers, enclosures, Electro Voice Marquis enclosure w/Electro Voice 12TRXB speakers, \$90. Manhattan Bch., 374-5635. A

Revolver, .22 Midget, 4" barrel, dble. action, reg., never fired, \$15. Hawthorne, 679-6581. A

Monza, 1962, 2-dr. club coupe, auto. trans., r/h, \$825. Torrance, 375-4593. A

Volkswagen, 1965, 1300 sedan, radio, low mileage, \$1450. Manhattan Bch., FR 9-5120. A

Refrigerator, \$75. L.A., 751-0981. A

For Sale

Honda, 1965 250 c.c. Scrambler, new Honda experimental clutch, extra carb. work, \$575. L. A., VE 7-6714. A

Aquarium, 15-gal., tank incl. reflector, gro-lux lamp & air pump, \$22.50. Santa Susana, 805-527-1974. A

Pickup, 1957 Ford Ranchero, air conditioning, r/h, near new eng., \$650. Hawthorne, OS 5-8335. A

Motorcycle, Honda 305 Superhawk, custom seat & tank, lots of chrome, low mileage, \$650. L.A., PL 6-7681. A

Home, 3-bdrm., 1 1/2 bath, dishwasher, lge. covered patio, 18' x 20' sep. rumpus rm., block walls & planters, terrace, tropical landscaping, fruit trees, walk to Northrop, \$25,500. Hawthorne, OS 6-8842. A

Car Cooler, inside-type, 12 volts, used 1 season, \$10. Torrance, 375-6467. A

Golf Clubs, 1965 Wilson-Staff, swing wt. D3-stiff, 14 clubs, less than 6 mos. old, \$324 retail; \$160. L.A., 838-8356. A

House, 4-bdrm., family rm., 2 1/2 baths, 1 acre, horses OK, near Northrop Ventura, \$35,000. Somis, 805-482-1186. A

Austin Healey 3000 MKIII, 1964, wood dash, wire wheels, \$2350. Redondo Bch., 379-7567. A

Pickup, 1960 Ford, 1 1/2-ton, lge. bed, 8 1/2' non-cabover camper w/bltins & intercom, \$1275; camper alone, \$475. Torrance, 320-3440. A

Aquarium, 3 10 gals. ea. w/reflectors & filters, \$15. P. V. Estds., 375-9842. A

Acreage, near Rosamond, in Antelope Valley-East Kern water dist., 10 acres at \$595 acre. Torrance, FR 8-1026. A

Apt. Bldg., 10 units, 9 1-bdrm., 1 2-bdrm., near Northrop, 4 yrs. old, 2 garages, 7 carports, \$89,000. Lawndale, OS 5-9695. A

Canary Bird Cage, lge., used little, \$5. Hawthorne, OS 6-0041. A

House, 3-bdrm., 2 baths, heated pool, block-wall fence, foot of Rolling Hills, buyer can assume 5 1/4% FHA loan, \$5000 dn., \$32,000. Torrance, 326-3575, DA 6-9413. A

Arbor Table Saw, 10" tilting Craftsman, on metal stand, 1 h.p. motor, \$115. L.A., VE 8-6054. A

House, 2-bdrm., 2-car gar., landscaped yard, redwood patio, playhouse, low down, \$19,950. Hawthorne, OS 9-7674. A

Chevrolet, 1958 station wagon, big eng., good mech. condition, \$275. Wilmington, 834-4184. A

Organ, Hammond M-3 spinet w/percussion, unmarred maple finish, \$795. San Pedro, 831-5837. A

Home, 3-bdrm., cape cod-style, tile roof, family & dining rooms, workshop, \$55,000. Miraleste, TE 3-5515. A

House, 2-bdrm., full dining room, fireplace, dble. garage, \$20,950. Inglewood, OR 1-3860, FR 5-5097. A

Ford Galaxie, 1965 tudor, r/h, p/s, factory air, 15,000 miles, \$2395. Long Bch., GA 3-1363. A

Home, 3-bdrm. & lge. den, patio & fenced yd., near schools & fwy., low down, decorator liv. rm., \$21,900. Gardena, DA 9-2904. A

Falcon, 1960 2-dr., stick shift, recently overhauled, new brakes, \$475. San Pedro, 833-5774. A

Pups, wiemaraner, 34 champions in pedigree, AKC reg., \$100. Rolling Hills, 377-1281. A

Poodles, miniature, apricot, AKC reg., avail. July 13, \$75. Gardena, 324-8613. A

Go-Cart, w/engine, \$50. Palos Verdes, 377-7361. A

Ford Taunus, 1961 4-dr. deluxe sedan, r/h, s/belts, 4-spd. trans., \$350. San Pedro, 831-9600. A

Motorcycle, 1965 Gilera, scrambler dirt bike, less than 800 miles, \$500. Hawthorne, 679-2006. A

Falcon, 1961, 2-dr., r/h, vinyl interior, \$300. Redondo Bch., FR 4-1509. A

Wanted to Buy

Cement Mixer, 4 to 8 cu. ft., elec. or gas driven, any condition. Lawndale, 679-2642. B

For Trade

Chevrolet, 1958 Impala sport coupe, 348 cu. in. eng., chrome wheels, trade for older station wagon & cash. Lynwood, 632-2642. C

FREE (To Be Given Away)

Kittens, 6, 1/2 & 1/4 Siamese. Long Bch., GA 4-9750. D

Dog, part miniature Schnauzer, 4 yrs. old, pepper color, Rolling Hills Estds., FR 5-8536. D

Rentals Offered

Apt., 2-bdrm., newly decorated, washer-dryer hookup, bltin range & oven, furn. or unfurn., from \$100. Brea, 528-4553. E

Apts., unfurn., 1, 2 & 3 bdrm., pvt. balconies, closed gar., sound proofing, hobby shop, children OK, from \$95 mo. Torrance, FR 5-0867. E

Bachelor Apt., single, furn., laundry facilities, 10 minutes to Northrop, \$70. Inglewood, 677-5705. E

Apt., 2-bdrm., 1-bath, water pd., children OK, no pets, 10 minutes from Northrop, parking, \$95 & up. Inglewood, OR 4-4473. E

Apt., 3-bdrm., 2 baths, vicinity Pico & La Cienega, \$165 mo. L.A., WE 5-4006, WE 5-9148. E

Apt, 1-bdrm., deluxe, pool, bltins, \$95 mo. Redondo Bch., 376-2117. E

Apt, deluxe 2-bdrm., furn., lge. pool, bltins, closed gar., near El Camino, \$145. Torrance, DA 9-5986. E

Apt, unfurn., 1-bdrm., 3 blocks to beach & King Harbor, piped music, bltin vacuum, gar. storage, \$105 mo. Miraleste, FR 9-8801. E

Cabin, Green Valley Lake, August reservations open, \$60 wk. Torrance, 320-2002. E

Apt, 2-bdrm., bltin oven, range, disp., pullman bath, thermo heat, carport, play yard, 2 children OK, \$100 mo. Torrance, 320-2827. E

Apts, all elec., unfurn., pvt. patio, lge. closets, many extras, \$130 & up. Torrance, DA 5-4021. E

Vacation Houses, in Balboa, reservations being taken; 2-bdrm. avail. July, Aug., \$125 wk., 4-bdrm. avail. July, \$200 wk. Inglewood, 672-3764. E

House, 4-bdrm., 1 1/4 bath, bltins, sep. dining rm., covered patio, fenced yd., newly decorated, near Nortronics P. V., avail. Aug. 1, \$200 mo. lease. San Pedro, 381-3438. E

Apt, deluxe 2-bdrm., furn., lge. rooms, bltins, encl. tub/shower, carport, & storage, near Norair, \$140. Hawthorne, 674-1358. E

Cabin, Lake Arrowhead, close to lake & village, \$55 wk.; \$25 w/end. No. Hollywood, 761-9645. E

Apt, 2-bdrm., upper, unfurn., bltins, carport, adults, no pets, \$135 mo. Inglewood, 672-8211. E

Apt, 2-bdrm., gar., disposal, small yard, 5 mins. to Northrop, \$95 mo. Hawthorne, 325-5705. E

Apt, 2-bdrm., lower unit, stove, bltins, 2 blks. from Norair, \$115 mo. Hawthorne, OS 6-7417. E

Vacation Cottages, Idyllwild, sleeping for 6, secluded, stream, patios, \$20-\$35 w/ends, \$50-\$60 wk. L.A., PL 4-5288. E

Apt, 3-bdrm., redecorated, bltins, disp., extra closets, carports, 2 baths, lge. family rm., \$160. Hawthorne, 676-2389. E

Studio Apt, spacious 2-bdrm., 2 1/2 bath, lux. features, sub. parking, \$180 on 12 mo. lease. Inglewood, 670-6084. E

Going my way?

Rides Wanted

7:30 a.m. — 4:12 p.m.

Studebaker & Foster, Norwalk. Margaret Williams, Norair, ext. 4388, 868-9414. 3

7:30 a.m. — 4:15 p.m.

Marine & Highland, Manhattan Beach. L. Berg, Norair, ext. 2763, 379-6762. 3

8 a.m. — 4:45 p.m.

Brookhurst Ave. & Crescent, Anaheim. Peggy M. Thomas, Nor. Anaheim, ext. 557, 774-4331. 5

Anaheim & Figueroa via Harbor Fwy., Wilmington. Tom Henrich, Norair, ext. 2425, 835-9070. 5

Prairie & Florence, Inglewood. Drive part time from that area. John Loest, Norair, ext. 4789, OR 2-4447. 5

Brookhurst & Adams, Huntington Beach or Harbor & Adams, Costa Mesa. Gene Dukette, Nor. Anaheim, ext. 438, 962-3763. 5

Venice & Sepulveda, Los Angeles. Sheldon Ossoff, Norair, ext. 1016, 837-2916. 5

Prospect & 190th, Redondo Beach. Guy W. Phillips, FR 4-1509. 5

Rides Offered

7:30 a.m. — 4:12 p.m.

Studebaker & Foster, Norwalk. Margaret Williams, Norair, ext. 4388, 868-9414. 13

8 a.m. — 4:45 p.m.

Brookhurst & Adams, Huntington Beach or Harbor & Adams, Costa Mesa. Gene Dukette, Nor. Anaheim, ext. 438, 962-3763. 15

Venice & Sepulveda, Los Angeles. Sheldon Ossoff, Norair, ext. 1016, 837-2916. 15

Personals

Flying Club, new Cessna 150's, full gyro panel, I.L.S. equipped, 2 certified flight instructors, \$7 hr. wet. Torrance, Hawthorne, OS 6-6138, DA 5-5288. L

For Sale or Trade

Cabin, 1-bdrm., 25' x 100' lot, Big Bear area, existing loan bal. \$7500; \$9500. or trade equity for property. Torrance, 328-0605. M

Comet, 1961 deluxe, stick, 1-owner, \$400 or trade for station wagon. Hawthorne, 327-2796. M

House, 5-bdrm., 2 1/2 bath, 4000 sq. ft., on 1/2 acre view lot, consider terms, \$77,000 or trade for income property or home. W. Covina, 339-8008. M

RETIREEES

A second meeting of Northrop retired personnel who are organizing a new club just for retirees will be held at 12:30 p.m., Monday (July 11) at NRC Clubhouse, Hawthorne.

More than 50 retired employees were on hand June 12 for an initial get-together and planning session. They named key committees to formulate plans for various phases of the program.

Combined NRC Councils have assisted in setting up the program which will be operated for and by the retirees. All former employees are invited to attend the July 11 gathering.

SQUARE DANCE

Northrop Recreation Club is sponsoring a beginner's class in square dancing for teenagers to be held at the NRC Clubhouse, Hawthorne, opening Saturday, July 19 at 10 a.m.

FRINGE BENEFITS

(Continued from page 2)

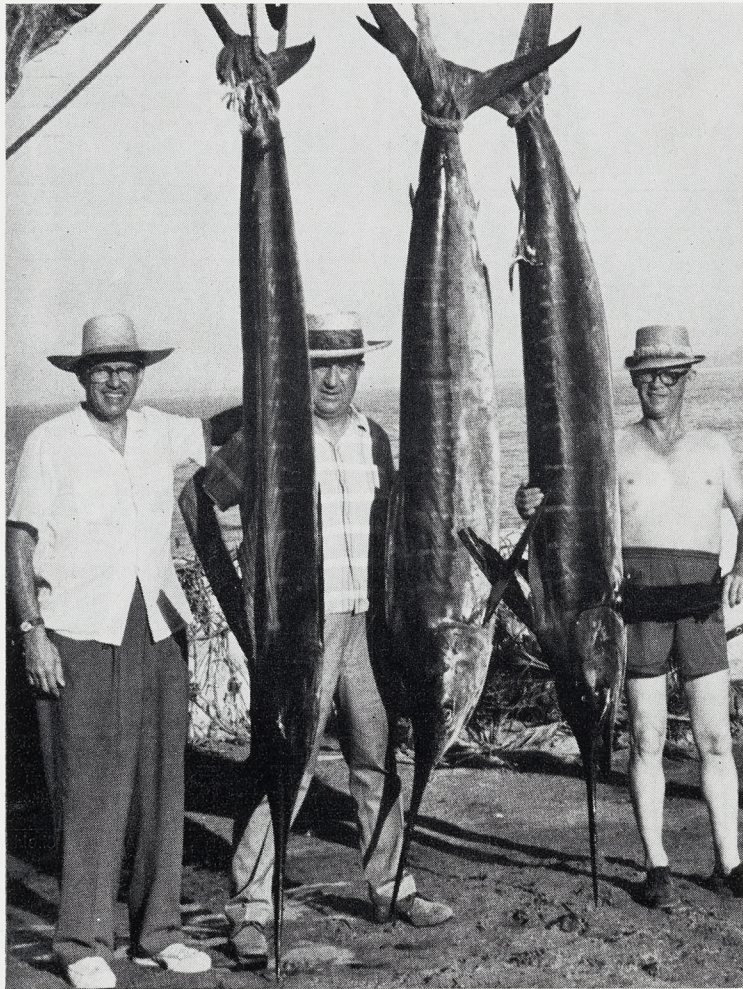
and Indiana. All of this is a tribute to our people who worked out the grievance procedure and an even better indication than we had before that our people really have an unusual "hot line to management".

The mail bag was pretty good in some other respects. There were some nice letters from some of our people and some good suggestions. As an example, one gentleman who has been under the weather and on medical leave for about two months wrote in saying how well our insurance people were taking care of him and making a suggestion which some of us should have thought of before. He told how nice it would be if the shut-ins could have copies of the Northrop News sent to them to keep them up to date as to what was going on. Arrangements are now being made to get this done. This brought to mind the fact that lots of retirees are interested in keeping in touch with their old company and with all of their friends at Northrop. There was a memorandum on my

desk telling about the things that the Northrop Recreation Club is doing to make sure that when we retire we can still feel that we are part of the company. All of us have to think about that approaching age and it is nice that we can include in our retirement planning the fact that Northrop people are still interested in us and that we will have a recreation program tailored especially to our needs.

Another change is being made in our insurance program which should be of interest to lots of our ladies. Up to now, men could get dependents' coverage involving their wives but women could not get the same coverage involving their husbands. There will be an announcement out in our various divisions as to the replacement of the old with the new coverage and how our ladies can obtain it if they wish. The effective date would be about August 1.

It was good to be away but it's just as good to be back.



BAJA BLACKSHEEP—That's what fishermen (from left) George Champion, John Steman and Doug Finch call themselves after a recent weekend trip to Baja California. They landed 180-pound marlin, but the fish were too big to bring back and too expensive to stuff.

NVRC ARTS AND CRAFT CLUB OFFERS SOMETHING FOR ALL

There's a lot of painting going on at Northrop Ventura, but don't expect to see any of the buildings change colors.

The brushwork is of the oils and water colors variety, and it's the work of the newly formed Arts and Crafts Club, which has 15 members and is growing steadily.

Acting commissioner is Peggy Walthuis, who started the club about two months ago "because I was certain there was a lot of interest here."

"The interest is intense, but a lot of people are shy about expressing an interest in the arts. If we can get them to their first meeting, they'll usually keep coming after that."

The new club received sanction from the Northrop Ventura Recreation Club, and meets at noon each Tuesday in Room 307A of the Administration building.

First projects include instruction in oils, commercial and fashion design, and sculpture.

Eventually, Peggy believes, activities will include field trips to scenic areas and to art exhibits. Then, perhaps, an all-Northrop art show.

"We've purchased an art course from Washington Art School in New York," she said, "and many of the members will be working on the same course."

MRS. BASSETT

(Continued from page 1)

will express our appreciation to all of the people at Northrop."

Mr. Bassett visited Northrop Ventura in May 1965, addressing the Management Club at a dinner meeting and other employees in an afternoon gathering.

He and Astronaut Elliott See were killed in the crash of a T-38 while Mr. See was attempting a landing in St. Louis in limited visibility and under adverse weather conditions.

They were to have piloted the Gemini 9.

The background of the club members, Peggy said, ranges from those with little or no experience to some who have made several paintings.

"We have members at just about all levels of experience," the acting commissioner said.

"Everyone has his own materials, and we store some equipment where we meet."

She hopes to add other art forms, such as mosaics, crushed rock painting, leatherscraft and feathered flower work, to the subjects studied by the club.

Miss Walthuis, incidentally, has quite a varied background in the arts. She won a scholarship while living in Cleveland, and later studied art at Valley College.



ART AT LUNCHEON—Members of the Northrop Ventura Arts and Crafts Club assemble for some noontime practice. Watching Louise Woods work on a scenic pencil sketch are (from left) Peggy Walthuis, who organized the club; Joyce Warren; and Eileen Munro.

Jean De Pue Marks 25th Anniversary

It was the summer of 1941—six months before the United States entered World War II—when a young Los Angeles-born man took a job at Northrop Norair as a subassembly inspector.

This month, 25 years later, Jean De Pue is a budget engineering administrator at Northrop Ventura. He received his 25-year pin from George Douglas, Ventura general manager and Corporate vice president.

Eight other Ventura employees also became eligible for service awards in June.

Mr. De Pue celebrates two other anniversaries this year:

He's been at Ventura for 10 years, and in the aircraft and aerospace industries for 30. He went to work for Douglas Aircraft in 1936, following his graduation from Polytechnic High School in Los Angeles.

Mr. De Pue became a Norair flight mechanic early in 1942, and advanced as a foreman and general foreman in Production Flight Operations.

In July 1956, he was transferred to Ventura as chief of Quality Control. From September 1961 until December 1964, when transferred to his current position, he was engineering administrator on the Apollo project.

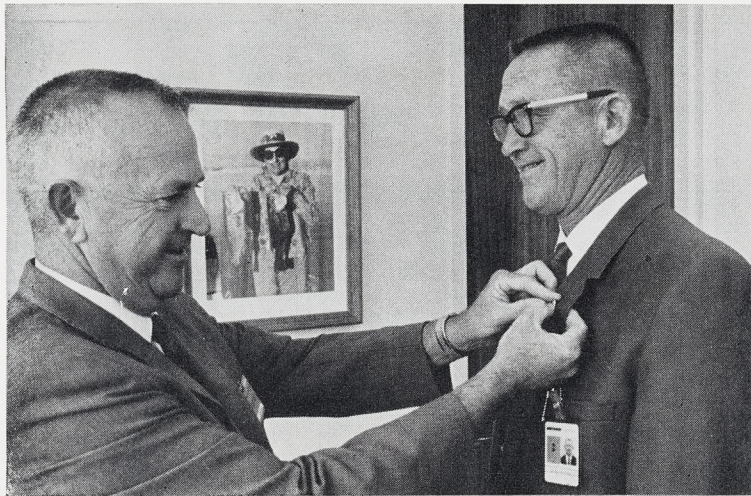
Mr. De Pue and his wife, Ila, live in Woodland Hills with their 24-year-old son, Jack, and 22-year-old daughter, Jeannie. A second daughter, Linda, 26, is married and has three children.

Receiving 15-year pins last month were Maurice Avena, Edna Beckwith, Juanita McGrath and Charles Whitney.

Ten-year employees are Marion Leppert, Ted Randolph and John Wolcott. Robert Bowditch received his five-year pin.

ALL-NORTHROP PICNIC

Sunday, August 28, has been selected as the date for the annual all-Northrop family picnic at Pomona.



A 25-YEAR MAN—Jean De Pue (right) receives his 25-year pin from George Douglas, Corporate vice president and Ventura general manager. Mr. De Pue, a budget engineering administrator, has been at Ventura for 10 years and in the aerospace business for 30 years.

CENTURY: A Step Forward With Ringsail Technology

(Continued from page 1)

craft and recoverable payloads in general is increasing."

The new Century is designed for a 9500-pound payload when used singly, and a 17,000-pound capability when used in clusters of two.

Following the test of the lighter Century this month, Ventura officials hope to analyze data and fabricate a large Ringsail for cluster tests early in September.

"We plan to drop a 17,000-pound weight from 10,000 feet with a cluster of two Century parachutes," Mr. Vickers said, "either with the medium weight or lightweight model. The cluster design will be determined after the next test."

The purpose of the Century project, Mr. Vickers said, is to maintain Ringsail parachute technology, compatible with spacecraft and booster vehicle growth.

"People are becoming aware of the feasibility of recovering boosters which had heretofore been expendable," Mr. Vickers said.

"A Gemini booster first stage on a shot last year was recovered after it fell into the ocean. It had no landing system at all, but was retrieved in good condition when it was found floating in the water."

Because boosters in use generally weigh 15,000 pounds and up, this necessitates the development of larger parachutes which may be used singly or in cluster. Solid cloth canopies have been

tested up to 200 feet in design but the Ringsail has not yet been demonstrated in this range.

Another possible use of the Century parachute—which gets its name because of a diameter greater than 100 feet—would be in rarefied atmospheres, where large, efficient drag surfaces are required.

The Century model tested, including canopy and lines but exclusive of its deployment bag, weighs about 230 pounds—which is comparable to those Ringsail designs for Mercury and Gemini, Mr. Vickers said.

The Century is deployed through use of a static line and one pilot parachute.

The design of the Century Ringsail was accomplished by Ed Ewing, of the Fluid Dynamics group at Northrop Ventura. Mr. Ewing is the inventor of the Ringsail parachute.

Representatives of the Air Force and NASA witnessed the successful Century test, along with the Ventura test crew.

The Century project originally was begun in October 1964.

Ordnance Handbook Contains Chapter Authored by Green

"I hope they sell a million of them."

So says William F. (Bill) Green, principal engineer (technical) in Data Services at Northrop Ventura, speaking of a new book, *Aerospace Ordnance Handbook*, published this month by Prentice-Hall.

To explain his enthusiasm, it should be mentioned that Mr. Green is the author of one of the book's 14 chapters. His contribution, "Test and Evaluation," is Chapter 12.

The 33-page chapter deals, in Mr. Green's words, "with tests as they apply mainly to small ordnance items."

"It's written for ordnance engineers and for managers of small businesses in aerospace ordnance," he said.

"You only get one chance to make a product the right way in ordnance. In electronics, if you're wrong about something, you generally can go back and redo it. In ordnance, a mistake can leave you without a product."

Mr. Green began working on the chapter in 1962, while he was director of Electronics and Testing for Special Devices, Inc.



Mr. Green

NV Writers' Workshop Holds First Meeting

Members of the Northrop Ventura Writers' Workshop Club convened last month in their first meeting since the club's founding.

They listened as member Harry McLaughlin, foreman of the Plastic Products branch, discussed the writing of religious articles and stories.

The group has 11 members, spokesman Ben Sumner said, and many more Ventura employees have indicated an interest in joining.

"Our eventual goal is to see many of our members actually have articles published," Mr. Sumner said.

The meeting was the group's first at night. Several organizational meetings had been held during lunch hours.

Duke Powell, ext. 1057, is commissioner. The group ordinarily will meet the first Tuesday of each month, but met on the second Tuesday last month because of Election Day.

NORTHROP NEWS

NORTHROP VENTURA

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Lifting Body Vehicle in First Glide

The Northrop-built M2-F2 lifting body research vehicle was launched on its first free glide flight early last week in an almost letter-perfect operation conducted at Edwards, California.

At the controls was Milton O. Thompson, chief lifting body research pilot for NASA's Flight Research Center.

Carried aloft under the wing of a B-52, the M2-F2 was launched at an altitude of 45,000 feet and a launch speed of about 450 miles per hour. Plunging earthward in a series of controlled maneuvers, the M2-F2 descended at a rate of about two and one-half miles per minute until at 1200 feet altitude, Mr. Thompson flared to reduce his descent to 10 feet per second. It touched down to a perfect landing on a Rogers Dry Lake runway 3 minutes and 37 seconds following launch.

This flight, the first ever conducted with a manned all-metal lifting body, is being heralded as a big step forward in technological studies of future manned re-entry vehicles.

NASA's office of Advanced Research and Technology is investigating the lifting body concept in flight to establish the technological base for design of future manned re-entry vehicles.

The lifting body, which is airborne by aerodynamic lift obtained from its rounded half-cone shape, promises greater maneuverability and flexibility to the nation's space programs. It offers a means by which a pilot returning from space could select, from a wide range of possibilities, suitable landing sites within the United States. Manned space flight missions to date have utilized ballistic-type re-entry and parachute recovery to a water landing.

Northrop has played a key role in all manned re-entry missions to date, building the parachute recovery system for both Mercury and Gemini programs already conducted or in progress and also for the forthcoming (See **LIFTING BODY**, page 3)



BREAKTHROUGH—Industrial conduits undergo Pac/Weld processing at Pacific Curtainwall plant in Long Beach. Process, which represents a significant breakthrough in the battle against corrosion of metal products, includes

infrared preheating section, Pac/Weld spray chamber, post heating section and water spray booth. Resulting from many years of research, Pac/Weld exterior coatings are guaranteed for a minimum of 10 years.

'IT'S A CHALLENGE,' MCKINNEY ADMITS ABOUT GIRLS TEAM

Herb McKinney faces a problem that even Casey Stengel was never confronted with when he managed the New York Mets.

Mr. McKinney, a Data Control clerk at Northrop Ventura, is the manager of Ventura's first women's softball team.

"It is quite a challenge," he admitted, "but we've got some pretty good hitters. All we have to do is get everything organized."

The team was formed at the urging of Mr. McKinney's cousin, Judy Schuler, who wanted to play softball but couldn't find a team.

The girls, from 18 to 33 years old, are still looking for their first win. They lost to Purolator, 7-6, and to TIC, 14-6.

Employees, wives and friends of other employees comprise the 15-woman team.

Mr. McKinney is a player and assistant manager on the men's team at Ventura.

Breakthrough by Pac/Wall Signals End of Corrosion

A superior organic finishing process guaranteed to outlast all known exterior finishes has been developed by Pacific Curtainwall, Inc., in conjunction with the Goodyear Tire and Rubber Company's Chemical Division of Akron, Ohio.

Pacific Curtainwall, headquartered at Long Beach, California, is a wholly-owned Northrop subsidiary which specializes in architectural design, metals and products.

The new coating process, called Pac/Weld, is a significant breakthrough in the long fight against corrosion, according to Douglas B. McFarland, president of the company.

Pac/Weld is being guaranteed for a minimum of 10 years and in most applications is expected to last up to 20 years or life. The life expectancy of conventional organic finishes is less than five years and in many cases no more than two years.

The result of several years of research, Pac/Weld employs a thermoplastic lineal polyester powder which is sprayed onto preheated metal surfaces with electrostatic guns.

One coat produces a super-strong insulating finish that bonds as well as protects, has lasting color stability against weather and ultra-violet rays, plus complete resistance to corrosion and cracking, to stains and to most chemicals.

The process can be used on virtually any metal product — architectural metals, marine products and such miscellaneous equipment as pipes, signs, guardrails, storage tanks, medical instruments, metal containers, toys, wire products, and so forth.

Pac/Weld is currently being applied to turnpike guardrails for eastern states, industrial electrical conduit for Shell Oil Company and architectural products for Northrop Architectural Systems, a Northrop subsidiary headquartered in the City of Industry.

Goodyear's contribution to the process is the polyester powder, while Pacific Curtainwall developed a mechanized powder coating system, which is capable of handling material sizes up to 32 feet in length, 18 inches in width and five feet in depth.

The Pac/Weld process is considered more economical than competitive techniques because of its long, maintenance-free service life, its one-coat operation and the fact that it requires no prior preparation, says Joseph M. Druliner, special products manager at Pacific Curtainwall.

Facilities also require less labor and floor space than conventional systems. In addition, more than 90 percent of the spray powder, which is applied in a fluidized (See **CURTAINWALL**, page 6)

Page Signs \$71 Million Army Pact

The U.S. Army Electronics Command, Fort Monmouth, New Jersey, has awarded Northrop Corporation's Page Communications Engineers, Inc., a \$71,679,900 contract for overseas communications systems. The order represents the largest single contract ever awarded by the Army Electronics Command.

As contractor, Page Communications Engineers will engineer, furnish and install and provide for one year of operation and maintenance of an integrated wideband communications system in a portion of Southeast Asia.

Page, with headquarters in Washington, D.C., is a wholly-owned subsidiary of Northrop. Page is a pioneer in the management, design, installation and operation of world-wide communications systems and has had extensive experience in the communications requirements peculiar to Southeast Asia.

In 1962 the U.S. Department of Defense assigned Page the task of installing a high priority military communications system in South Vietnam. Within seven months the country had an operational mobile troposcatter system, the largest of its type anywhere. Normally this project would have taken up to two years.

The system and subsequent improvements and additions to the so-called "backbone network" is managed by the Defense Communications Agency and maintained by Page's civilian engineers and technicians. It is operated by the four military services.

The major portion of communications equipment in Southeast Asia uses the tropospheric scatter principle. In scatter communications, powerful transmitters direct narrow radio beams at angles a few degrees above the horizon. The beams encounter irregularities in either the troposphere or the ionosphere (depending on the frequencies used) and then scatter downward to receiving antennas hundreds of miles away.

Page engineers were among the first to design and build tropo and iono systems.

SIXTEEN RECEIVE SERVICE AWARDS

Sixteen Northrop Ventura employees became eligible for service pins this month, led by Mrs. Joan Clark, who joined the firm at Northrop Norair in 1951.

Mrs. Clark, a senior secretary in the Contracts group, transferred to Ventura in September 1963. She was the only recipient of a 15-year pin this month.

Employees who become eligible for 10-year pins were:

Lou Castagana, Bart Cook, Silvio DiPasquale, Arthur Grieger, Hal Kornell, Shirley Miller, Anthony Piscuskas, Irving Podemski, Robert Reese, George Rigby, Richard Schultz, Mary Tremmer, and Peggy Walthuis.

Receiving five-year pins were Oscar Cease and Elaine Lee.

MARY GATES NAMED SUPERVISOR

Women and Plastics Seem to Mix

It was July 1956. The RP-70 program was in full swing at Northrop Ventura, and the RP-76 was still two years away.

Sam Lerner, then foreman of the Plastic Products branch, hired a young housewife that month as the first woman ever to work in Plastics at Ventura.

Today, after 10 years, Mary Gates has acquired another first—she's the first woman to become a supervisor in Plastic Products.

Her hiring at Ventura started a trend. Seventeen of the 20 workers on Mrs. Gates' lamination and fabrication shift are women.

"I guess I started something,"

Mrs. Gates said, "and I'm glad I did, because women are ideally suited for plastics work."

"Women have more patience than men in operations which require sitting in one place all day,

(See photo on page 6)

doing the same thing all the time. That's why women do so well in laminating and small parts assembly."

Mrs. Gates began at Ventura as a plastics fabricator. Next, she was promoted to leadwoman. And last month, the announcement of her advancement to supervisor was made by Harry McLaughlin, foreman of the Plastic Products branch.

"I haven't had any trouble in my job because of being a woman," Mrs. Gates said.

"All the men I've worked with have been helpful and friendly, and I've gone as far as I have because I've been inspired in my work by my supervisors."

How do the three men on Mrs. Gates' shift feel about having a woman as their immediate supervisor?

"One of them said something when I was promoted that I thought was really nice," Mrs. Gates said.

"Somebody asked him if he resented having a woman for his supervisor, and he said, 'Well, I have a woman boss at home.'"

FRINGE BENEFITS

Retirement: Northrop Prefers To Consider the Human Element



By WILLIAM LARRABEE
Vice President—Industrial Relations

Two gentlemen spoke to me recently about the possibility of continuing work at Northrop after age 65. From my discussion with them I gathered that the Northrop attitude in this respect is not too clear to our people. This is not a bit surprising because no company has ever been able to come up with a perfect answer to the retirement age problem. The simple thing to do, of course, is to establish a rule which many companies have which says, in substance, "Age 65—Out." This leaves no question in anybody's mind as to when his employment with his company is over. It affects everyone from the President on down. It has some good points, such as the assurance it gives to the young person coming along that the boss is not going to work until age 75 or 80 and deny him the advancement which he otherwise would have had. Organizations with mandatory retirement age insist that they thus keep real comers on their payrolls who would otherwise go somewhere else. Perhaps they are right in this thinking. The big trouble with this approach is that it eliminates the human element which has always been so important at Northrop. The minute one takes human elements into account, however, one runs into human problems.

The difficulties with a flexible system are pretty apparent. In the first place, most people getting into their 60's are perfectly convinced that they are just as good as they were when they were 40, and they are not about to be told otherwise. In fact, some people are as good or better in their 60's, particularly in view of their long experience and mature judgment. Secondly, many people who get into their 60's and who are really incapable of keeping on with their work have financial problems and need the income which work brings. In the third place, many people who have worked all their lives have a sense of insecurity about cutting loose. Lastly, and probably the toughest problem of all, is that under a flexible system someone in the company has to make a decision that one person may continue work and another may not.

Whole books have been written on this subject of retirement. Out of all of the information on the subject Northrop has tried to find a reasonable solution. Our way is not perfect because it includes the human element, but it works pretty well. Let us suppose that Mr. "A," who has been with the company quite a while, is approaching age 65. Normal retirement age at Northrop is 65. If Mr. "A" does nothing, he will be retired at 65. If he wishes to keep on working, however, he must so

inform his Industrial Relations office and he will be furnished with a form which he will fill out in which he will request continued employment. This form will then be presented to his supervisor and the difficult judgment will be made as to whether or not, in his supervisor's mind, his employment should continue. The form is then processed to the Retirement Board. This board is appointed by the corporation's board of directors to administer the company's Retirement Plans, and is made up of corporate and divisional management people. The board's judgment is final and its general inclination is to continue Mr. "A" at work unless there is a showing from supervision that this would not be the thing to do. In each case many factors are considered, such as the nature of the job, the state of the health of the individual, the fact of whether the work force is expanding or contracting, etc. If Mr. "A's" application is approved, the approval is good for a maximum of one year, when it is again reviewed if he so requests. In short, Northrop has chosen the hard way to reach these decisions, but has also taken the human way. As a result of its policy, while some people have been disappointed there are others now working here who would be retired against their wills in many companies.

There is one further aspect of this problem which might be of interest. Once in a while the company hires back an individual who has already retired. This again requires the approval of the Retirement Board. The board does not look with much favor on this practice and requires a clear showing that a person hired back has a skill which cannot be found in the existing employee body, or is not otherwise available. The board would prefer to see supervision look hard for skills among the present work force. All in all, while there is no right under our plans and policies to work past age 65, and no one should count on it, the prospects of being kept on are reasonably good. The prospects of being hired back after retirement are not so rosy.

On a different subject, one more reminder for the ladies. It is hoped that everyone has seen the notice about the cancellation, effective August 1, of our previous husbands' coverage and that everyone who wants the new coverage on her husband has signed up. If any of our ladies have not been fully informed as to the fact that they may now list husbands under dependent coverage and what this coverage does and does not do for them, they should call their Industrial Relations office or the Group Insurance office—Norair Division, ext. 1210.

Equal Opportunity Booklet Praised By Vice President

Vice President Hubert H. Humphrey has praised the efforts of Northrop Corporation and several individual employees for their contributions to the publication of a "Plans For Progress" booklet titled "You Too Can Be A Winner."

In a letter to Thomas V. Jones, Northrop president and chairman, the Vice President noted the contributions made and added:

"Please accept my deep appreciation for this effort by your company and extend my thanks to Roland B. Scott for the assistance I am told he provided in producing the booklet.

"Efforts such as this by 'Plans For Progress' companies reaffirm our faith in their interest in making equal opportunities a fact in the lives of all Americans."

The booklet presents, in text and photographs, the experiences of outstanding individuals from minority races who now hold responsible jobs with Los Angeles area firms.

Four Northrop Corporation employees are included. They (See WINNER, page 5)

Howard G. Rath, Jr. Named Tax Counsel

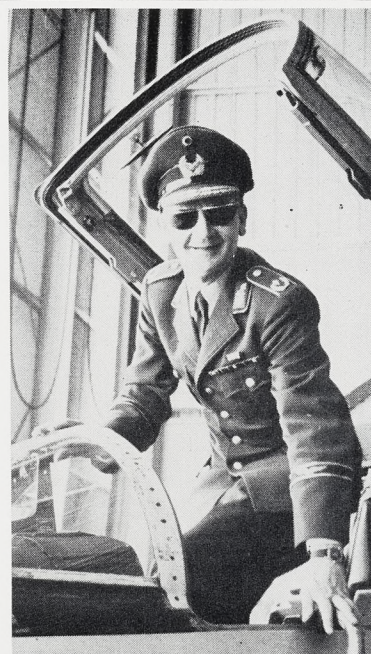
Howard G. Rath, jr., has been named Northrop tax counsel, it was announced this month by J. Grant Macdonnell, vice president and controller.

Mr. Rath is responsible for review and approval of major tax matters of concern to the corporation. His office is in Beverly Hills.

A specialist in corporation, real property and tax law, Mr. Rath has been associated with the law firm of O'Melveny and Myers since 1958.

He is a graduate of the University of California (Berkeley), where he majored in business administration, and he earned a bachelor of law degree at the University of Southern California.

He is a member of Phi Beta Kappa, the University of Southern California Law Review and the Order of the Coif.



During a recent tour of the U.S. Air Force Flight Test Center, Edwards AFB, California, Brig. General Wilhelm Fahlbusch of the German Air Force visited the Northrop facility at Edwards. General Fahlbusch, chief of advanced plans for the GAF, is shown here in the cockpit of a Northrop F-5 supersonic tactical fighter.

Quarterly Savings Pass \$8.6 Million

Cost reduction actions reported under the Cost and Management Improvement Program (CMIP) during the first three quarters of fiscal 1966 amounted to \$8,655,260, it was announced recently by Ken Hornor, Corporate Cost and Management Improvement Program coordinator.

Savings to date have come on 943 separate CMIP actions at Northrop's three divisions and Data Processing department.

The total is running nearly \$500,000 ahead of the same period in 1965, when the corporation wound up the year with a total of \$19 million saved.

However, because of a change in the reporting procedure, it is probable that this year's total will fall short of previous annual savings, Mr. Hornor said.

The fourth quarter, which historically has been the most productive period for cost reduction reporting, is being cut one month short this year in order that Northrop may (See SAVINGS, page 4)

TIME OUT FROM BOEING 747 DESIGN

Seattle Rolls Out Red Carpet for Stan Murnane Family

They rolled out the red carpet in Seattle, Washington, late last month for Northrop's Stan Murnane and his family.

The occasion was, Mr. Murnane reports, "Interesting, exciting and rewarding."

Mr. Murnane heads stress activities for a Northrop Norair work force of approximately 90 engineering personnel who are working closely with Boeing Company engineers in preliminary design work on the Boeing 747 program.

This group is carrying out early Northrop commitments on a program which calls for Northrop to design and fabricate a substantial portion of the fuselage for the 490-passenger commercial aircraft. Later they will return to Hawthorne to guide engineering groups responsible for detail design activities.

The Seattle Chamber of Commerce selected the six-member Murnane family to help open the Seattle Center. This Center, once the heart of the Seattle World's Fair, features art, science and sports facilities, plus the famed Space Needle restaurant and observation tower.

After breakfast in the Space Needle, the Murnanes were featured on a television program, a radio interview, then shown about the center by a group of girl guides who handle crowds during summer months.

"We were all quite pleased with the

attractions and look forward to revisiting them later this summer at a more leisurely pace," Mr. Murnane said.

Since settling in Washington for the summer, the Murnanes have acquired a house on Mercer Island and a 14-foot speedboat which is now the family fun

center. They all ski and make excursions up and down 20-mile long, six-mile-wide Lake Washington.

"Many of the Norair men here have brought their families along with them and enjoy the opportunities for outdoor fun," Mr. Murnane said. "Novel to us all is the fact we can drive about 15 minutes in any direction and suddenly we are in the wilderness."

Designer Al Pierce and his family recently departed on a combination boat and rail trip up through Canada to Alaska as a vacation junket.

And Bill Hickie has acquired a seaplane in which he flies to the many lakes and rivers in the area for sports fun.

Mr. Murnane reports a very close and cooperative working relationship with Boeing Company people whom he describes as "really wonderful to know."

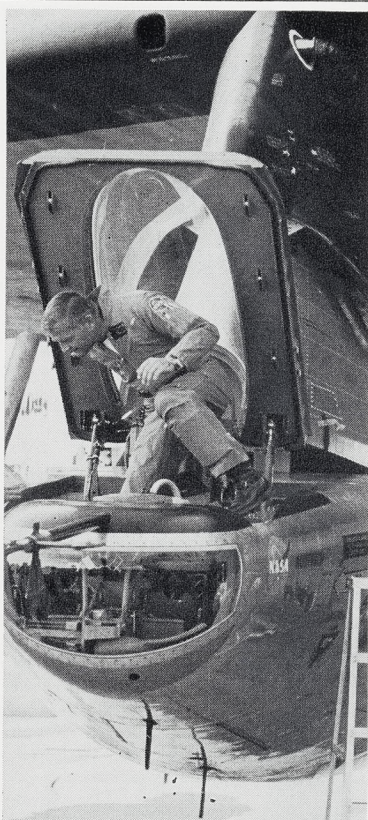
"Most of us have just gotten settled down and our families located," Mr. Murnane said. "We are beginning to exchange social visits with our Boeing friends and all of us are looking forward to a busy, but interesting, summer up here."



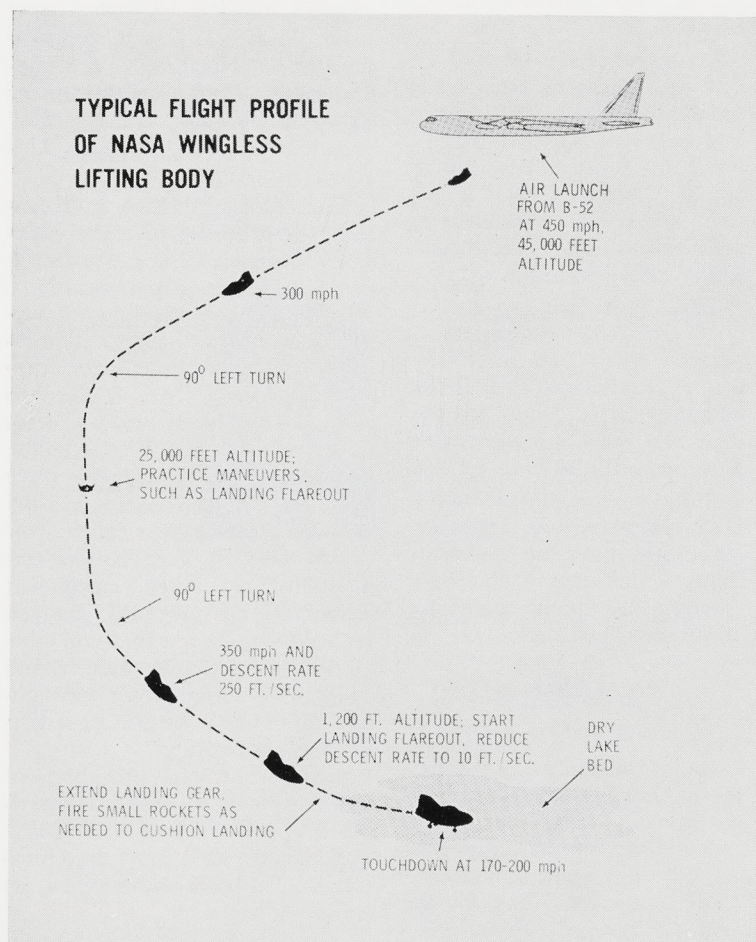
TOURING SEATTLE CENTER—Norair's Stan Murnane and family are shown with guides and Chamber of Commerce officials as they tour Seattle Center. Murnane family was selected from among Northrop people working at The Boeing Company.



Final moments prior to first free glide flight of Northrop-built M2-F2 lifting body found Pilot Milton O. Thompson in conversation with NASA technician as B-52 crew members make inspections.



NASA Pilot Milton O. Thompson enters M2-F2 cockpit (left photo) and minutes later a ground crew member guides B-52 out of its parking spot. Early morning sun silhouettes M2-F2 under wing. After 20-minute climb to 45,000-foot altitude, M2-F2 was launched for a controlled flight to earth in just 3 minutes, 37 seconds. Flight was first of an all-metal lifting body.



LIFTING BODY: New Re-Entry Concept

(Continued from page 1)
Apollo lunar exploration program.

In mid-1964 Northrop Norair began work, under contract to NASA, on two lifting body research vehicles, the M2-F2 and the HL-10. The former was delivered in June 1965 and the latter in January 1966.

A special Norair task force working under Director Ralph Hakes provided structural and system design required and then fabricated both vehicles.

Since that time both vehicles have gone through extensive wind tunnel test programs at NASA's Ames Research Center.

Planned flight test programs for the two vehicles are essentially the same.

Prior to its July 12 free-flight, the M2-F2 was put through a series of captive flights and ground runs. High-speed taxi tests were made with the M2-F2 mated to the B-52

with a special Northrop-produced pylon adapter. Another series of taxi tests, using its own landing assist rockets for power, were made to demonstrate the M2-F2 steering and brake effectiveness of the landing gear. This was followed by two complete systems check-outs in captive flights with the M2-F2 mated to the wing of the B-52.

The July 12 free-flight operation was conducted shortly after dawn to avoid hazardous desert winds and thermals or updrafts usually present later in the day at this time of the year.

Following an intensive check out routine on the ground, the B-52 took off for a circular 20-minute climb to altitude. Mr. Thompson was busy in the M2-F2 cockpit carrying out pre-launch checks, including test bursts of four rocket engines which can be used in final approach to cushion the landing.

They were not used.

Mr. Thompson launched himself in a straight-ahead glide and then executed a 90-degree turn left. To observers on the ground he appeared to be plunging earthward at an excessive speed. However, the M2-F2 was under full control at all times. On this leg, Mr. Thompson performed a practice landing flare at about 25,000 feet and briefly ignited his rockets.

He then went into a second 90-degree turn left and was on his final approach. His top free-flight speed after launch was about 320 miles per hour. Approximately 1200 feet above the dry lake bed he began a second flare maneuver to slow his rate of descent. He skimmed low over the runway, lowered his landing gear, then touched gently down at a speed of about 195 miles per hour and rolled to a stop.

Northrop Photos
by Sam Orr
Flight Profile
by NASA



News representatives covering first flight of M2-F2 listen carefully to playback of conversations recorded during flight (above). Television cameras grind as NASA Pilot Mil-

ton O. Thompson describes first flight (right) and NASA Flight Research Center technicians conduct close post-flight inspection of the M2-F2.



AD ASTRA PER ASPERA

Aerospace Physiologists Elect Dr. Lombard Charter Chairman



By the Northrop News Staff

Dr. Charles F. Lombard, who has spent the past 25 years in making flight safer for man, is the first chairman of the newly formed Aerospace Physiologist section of the Aerospace Medical Association.



Dr. Lombard

Dr. Lombard is head of the Biodynamics Laboratory at Northrop Space Laboratories.

Chartered April 20 during the 37th annual meeting of the AMA, the 70 charter members of the new section also installed Navy Captain Mary Keener, chief of the Bureau of Medicine and Surgery's physiology section, as vice chairman; Air Force Lieutenant Colonel James W. Evans, aerospace physiologist in the Office of the Surgeon General, as secretary-treasurer; and Navy Captain W. E. Goldenrath, aerospace physiologist at North Island Naval Air Station in San Diego, as bibliographer.

"Everything is so new," Dr. Lombard said this week, "that we are still in the process of forming committees and making plans which will ensure the proper growth of the section."

"Physiologists, by far, make up the largest single portion of the Aerospace Medical Association and up to now have been the only group which did not have its own section. I am confident that this new organization, as a forum for expression and exchange of ideas, will play a significant role in the further advancement of space medicine."

Dr. Lombard has been a member of the Aerospace Medical Association since 1942. His highly productive career, which includes numerous inventions and technical publications, encompasses the university, military and industry approach to physiological research.

At Northrop since 1960, Dr. Lombard set up the Biodynamics Laboratory in 1962. His staff presently numbers about 30 engineers, scientists and technicians.

"There is a tremendous number of specializations within aerospace physiology," says Dr. Lombard, "and one of the objectives of the section will be to improve communications on important achievements at the university, within the military and government agency laboratory and in industry."

(At NSL, the emphasis is on the physiology of stress and the development of equipment to protect the human organism from the dangers of stress. The three major types of stress under study are acceleration, thermal load and changing atmosphere.)

It is possible there are some aerospace physiology circles in which Dr. Lombard is not personally known, but there are few to which he has not contributed.

In 1961, he headed a committee which devel-

oped, for the Aerospace Industries Association, the first recommended safety practices for manned space chambers. The committee's report was accepted by the National Standards Association.

In 1950 he headed another AIA committee which developed safety standards for low pressure chambers.

Animal lovers throughout the world are indebted to him for his studies on euthanasia, which determined that the most humane method of disposal of unwanted animals was by placing them in a chamber and lowering the pressure to the equivalent of 55,000 feet altitude.

He developed the Lombard Oxygen Therapy Mask during a pneumonia epidemic several years ago when people were dying because there weren't enough oxygen tents to go around. It worked so well, there are few oxygen tents around.

With H. P. Roth, who is now a consultant at Northrop Space Laboratories, he developed the crash helmet which supersonic aircraft pilots wear today.

At the University of Southern California, Dr. Lombard received both a bachelor's degree in physics and a doctorate in pharmacology and physiology. He later was an associate professor in the USC School of Medicine.

A lieutenant colonel in the Air Force Reserve, he served two tours of active duty, where he conducted physiological training, proof testing of personal equipment and survival gear and crash injury research.

Vietnam Air Symposium

One of the most complete and accurate reports to date on the air war in Vietnam was given not too long ago at a symposium sponsored by the Air Force Association (AFA) during its national convention at Dallas, Texas.



Mr. Alison

It was the first public and unclassified presentation to cover the full spectrum of the USAF effort.

While the symposium was rather extensive in its content, perhaps a good summary would be two quotes from two of the principal figures.

According to Lieutenant General Sam Mad-dux, jr., vice commander in chief of the Pacific Air Forces:

"While this conflict has often been called a ground war, it would be more accurate to call it a dramatic demonstration of the margin of difference air operations provide against guerrilla attacks in support of ground operations in a limited war environment."

"I do not say that airpower alone will win the war, but I do say that without airpower we most certainly would lose."

(See AD ASTRA, page 5)

WESTERN MOTIF ADOPTED BY NRC FOR FAMILY PICNIC

Get 'em up, get 'em moving, pardner, it's "Roundup Time."

This old-fashioned call, the call of the trail boss, was echoing throughout Northrop Corporation this week as plans move ahead for staging the first all-Northrop family picnic in two years.

The date: Sunday, August 28. The place, Los Angeles County Fairgrounds at Pomona.

That's when Northrop Recreation Clubs pool their talents to bring Northrop families a full-day of fun, beginning at 10 a.m. and continuing until 7 p.m.

Everyone is invited and just about everything is "on the house"—rides, games, fun, entertainment, prizes and surprises. There will be nominal charges for food items, but soda pop, ice cream and other items will be distributed without charge. And there is no admission charge.

Long one of the favorite annual get-togethers for Northrop families from all divisions, this event was last held in 1964. It is being resumed this year by popular request. And it has been scheduled in the waning days of summer, just before winter activities begin.

This year the sponsoring NRC Councils have selected a western motif and a western theme, "Roundup Time." Those attending are invited to don their best jeans and western regalia and join the fun.

More information about the many events will be forthcoming. Right now the important thing is to reserve the date, August 28, your date for "Roundup Time."

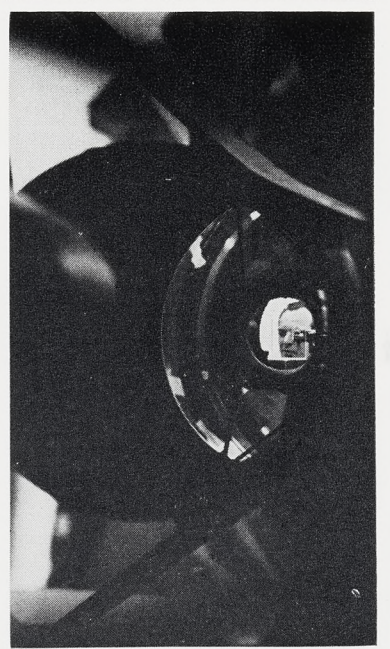
SAVINGS

(Continued from page 2)

change its CMIP reporting period to coincide with that of the government's fiscal year.

Northrop's fiscal year ends on July 31, while the government closes its books for the year on June 30. Fiscal 1967 began July 1 for Northrop's CMIP reporting, resulting in the shortened fourth quarter.

The change in reporting periods applies only to CMIP. Regular financial reporting will continue on the August 1 to July 31 basis.



Peering through open end of ALOTS exterior pod, this Northrop Nortronics technician inspects optical system which is now in operation by U.S. Air Force Eastern Test Range for all-weather tracking of missile and space shots.

Local Rice Alumni Elect Martin Gould

Dr. Martin J. Gould, program scientist for Northrop Space Laboratories' Apollo Experiments Pallet study, has been elected president of the Los Angeles Rice University Alumni Club.

Located near NASA in Houston, Texas, Rice University is actively engaged in space research

programs. NSL recently developed a spacecraft structure for Rice to house its "OWL" satellite, scheduled for launch in the near future.

Though traditionally a limited enrollment school, Rice is currently engaged in a \$33 million expansion program," Dr. Gould said, "and along with alumni groups throughout the country we will be assisting in fund raising."

George Brown, president of Brown and Root, Northrop's partner in a joint venture at the Manned Spacecraft Center in Houston, is chairman of the expansion program.

Although Dr. Gould earned his doctorate in applied geophysics from the California Institute of Technology, he is an alumni of the University where he received both his bachelor's and master's degree in physics and nuclear physics, respectively.



Dr. Gould

WEST COAST DIVISIONS ASSIST

Carolina Opens Propulsion Systems Test Control Center

Northrop Carolina this month opened for business an automated control and data acquisition center to support static tests of rocket propulsion systems at its Asheville, North Carolina plant.

During development phases of propulsion units, the new facility will be used by the ordnance manufacturer somewhat like a wind tunnel is used by aircraft developers. However, the facility will serve in testing production items as well as designers' concepts, according to Ken Kirkland, test manager.

The rows of switches, relays, lights, oscillographs, and such, which panel the 14 by 18 foot control room, are of an inexpensive, special purpose design. The project employed the assistance of engineers and technicians from Northrop's Norair and Nortronics Divisions at Hawthorne.

"Remarkably, it was designed and built in six months," Mr. Kirkland said.

The system has a capability of handling approximately 80 data channels including 24 resistance bridge transducers, 40 thermocouples, and 15 event channels, in addition to timing, ignition and miscellaneous data events.

Two of the most potentially rewarding rocket development programs being tested are the controllable solid rocket, which can start, stop, throttle and restart on command, after the combustible rocket, which reduces itself to a harmless ash after it fires.

Northrop Carolina short-duration ejection motors presently are used on Polaris, Atlas F, Titan I, and Titan II and Minuteman missiles.

Another product of the broadly diversified subsidiary which will be tested in the new control center is its line of gas generators, presently being produced for missiles. Ultra high-pressure gas generators are currently in development.



In secluded valley, more than a mile from main plant, Northrop Carolina conducts tests.

While the control center is comparatively simple, it can handle some special tests extremely short in duration (action time in milliseconds) which compares with the most ultra-modern centers, Mr. Kirkland said.

Assisting Mr. Kirkland and Senior Engineer Bert Morgan in the buildup, installation and checkout of the system were engineers Harold Bigelow of NSL and Tom Klouse of Norair, and technicians Maurice Burke, Hank Laster, Bill Pedersen, and J. C. Stephens of Norair.

Nortronics Hawthorne furnished technicians Jim Rheins and Bill Wall of Computer Test group and John Phillips, associate engineer of Subsystem Test group.

Northrop Carolina technicians who participated in the team effort were Norman Miller, Jim Elmore, Bob Davidson, Bill Weaver and John Gaidin.

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

For Sale

Organ, Thomas chord, elec., full size, walnut finish, bench & all music incld., \$300. Downey, TO 9-7410. A

Refrigerator, Servel, gas, white, 10 cu. ft., \$50. Torrance, 371-9651. A

Wedding Dress, worn 2 hrs. in May, white, size 8, scalloped neckline, full length, chapel length train, \$25. Gardena, DA 9-9046. A

Skis, 7', 1 pr., steel edges w/poles & tobagan, 6', used twice, \$10. San Pedro, FR 2-6585. A

Poodle, AKC reg., black, male, toy, \$50. Norwalk, 864-7673. A

Chevrolet, 1957, 2-dr., new paint & starter, needs tune-up & tires, \$185. Torrance, 835-5708. A

Tuner, Motorola FM, \$40. Panorama City, 894-3244. A

Chevrolet, 1959 Bel Air, 2-dr. sedan, \$399. Inglewood, 674-1847. A

Movie Camera, 8 mm, Mansfield Holiday auto., zoom lens, pistol grip, leather carrying case & tripod in case, used 3 times, \$60. Box 1401. A

Boat, 14' w/30 h.p. Johnson eng., \$350. Playa del Rey, 823-2238. A

Piano, Horace Waters & Co., upright, grand, mahogany, 5' wide, 4 1/2" high, 3 pedals, deliver if reasonable distance, \$175. Torrance, 325-3404. A

Impala, 1964, 2-dr. h/top, r/h, Vibrasonic, auto. trans., s/belts, 27,000 miles, \$1900. El Segundo, 322-4130. A

House, 3-bdrm., 1 1/4 bath, dble. gar., fenced yd., sprinklers, newly painted, 5 mins. from Northrop, \$23,995. L.A., PL 7-3595. A

Dresser, Danish walnut, white top, 4 yrs. old, \$40. Torrance, 375-2018. A

Austin Healey, 3000 MK III, 1964, 4-spd. & o.d., \$2350. Redondo Bch., 379-7567. A

Square Dancing Dress, blue & white checked gingham, worn once, size 12, \$8. Hawthorne, OS 9-6334. A

Sailboat, Columbia 15, complete w/dacron sails, whisker pole & boat cover, \$995. Garden Grove, 714-531-5391. A

Hearing Aid, glasses or Zenith behind-the-ear type, used twice, either type \$185. L.A., AX 1-6653. A

Range, gas, copertone, 1 1/2 yr. old, center grill, \$100. Torrance, 325-9817. A

China, Easterling, damask pattern, 4 5-pc. place settings, plus creamer & sugar, platter & lge. bowl, open stock, \$80. El Segundo, 322-0678. A

Jigsaw, 18" throat, 12" table, hvy. duty motor & stand, extra blades, \$25. Inglewood, PL 5-4497. A

Hair Dryer, professional studio-type, \$70. Inglewood, 672-7424. A

Shotgun, Higgins 12-gauge auto. w/raised rib & Polychoke, \$60. Hawthorne, OS 5-0667. A

Bicycles, Schwinn or Murray, 24" boy's, \$10. P. V. Pen., FR 7-5853. A

Trailer, 10' teardrop, new tires, \$150. Gardena, DA 4-0449. A

Dishwasher, portable-type, Kitchen Aid, never used, still crated, \$100. Manhattan Bch., 788-7519. A

Surfboard, Bing, slight nose damage, repair kit incld., \$40. Hawthorne, 644-2592. A

Wire, 5/8" mesh, 4 lengths, 10 1/2' long, 2 3' high, 2 2 1/2' high & lumber, \$10. Hawthorne, OS 6-0041. A

Impala sport coupe, 1958, 345 cu. in., V-8, chrome reverse rims, \$795. Lynwood, 632-2642. A

Mattress, twin size, Englander 1020, ortho super-firm, \$25. Hawthorne, 675-5802. A

Ford Fairlane, 1955, r/h, V-8 engine, \$150. Torrance, 371-1949. A

Range, Frigidaire elec. 30", \$40. Torrance, DA 6-1999. A

Pickup Truck, 1962 Chevrolet, 3/4-ton, lge. bed, 6-cyl., stick, r/h, hvy. duty rear axle, low mileage, \$1195. Bell, 581-5208. A

Impala, 1960, convt., new paint, auto. trans., w/w, \$500. Gardena, 776-6627. A

Karmann Chia, 1965, deluxe-model, wooden steering wheel, r/h, w/w tires, \$2395. Torrance, DA 9-9670. A

Dresser w/mirror & 2 night stands, white, modern, \$25. Inglewood, 677-9333. A

Stove, 2-burner elec., \$10. L.A., 472-3374. A

Refrigerator, Crosley Shelvador, white, \$45. Torrance, DA 3-8797. A

Camper, for stepside Chevrolet pickup, 1/2-ton, \$50. Redondo Bch., FR 2-5310. A

Pontiac Catalina, 1963, w/w, r/h, \$1595. Whittier, 944-5623. A

Travel Trailer, 16' Shasta, many extras, \$800. Torrance, DA 6-5566. A

American Rambler, 1957 Cross Country, \$200. Gardena, OS 5-2159. A

MG, 1963 sports car, good cond., \$1100. Gardena, 329-5006. A

Acreage, 116, 16 fwy. miles east of San Diego, \$495 acre. Costa Mesa, 642-0614. A

Tent, 9'x14', umbrella-type, no center pole, Sears, w/integral floor, \$25. Box 1402. A

French Poodle, miniature, female, 3 mos. old, white, housebroken, \$50. Box 1403. A

Organ, Lowrey, theatre spinet, model H, consider free equity to responsible party, warranty in effect, \$1900. Manhattan Bch., 374-5635. A

For Sale

Lawnmower, hand-type, 14" ball bearing, 1 yr. old, \$8. Hollydale, ME 3-2395. A

Volvo, 1958, \$175. Hawthorne, 674-1885. A

Roller Skates, girl's, size 8, worn 3 times, \$10. Lawndale, 676-9996. A

House, 2 on large lot, 4-bdrm. & 2-bdrm., \$35,950. Inglewood, OR 4-6386. A

Sailboat, 19' Lightning class, trailer, dacron sails, \$575. Hawthorne, 675-6963. A

Bed, dble., eastern hardrock maple, bookcase type headboard w/2 drawers, footboard, box springs & mattress, \$50. Torrance, 323-1400. A

Ford, 1955 2-dr. Crestline, good eng. & tires, \$150. Torrance, 324-6488. A

Pickup, 1956 Ford 1/2-ton, 1958 eng., 6-cyl. stick, \$350. Inglewood, 674-7301. A

Darkroom Equip., complete, Opemos enlar., 11"x14" trays, poly con filters, \$100. Hawthorne, 671-0087. A

Ford, 1959 2-dr. h/top, 352 cu. in., slicks, \$450. Hawthorne, 679-2006. A

Table Lamp, tall, white ceramic base, white shade, \$15. Fullerton, 714-526-1521. A

Bedroom Set, \$50. Buena Pk., TA 7-1352. A

Washer, auto. Kenmore, 1960, modern fabrics cycle & lint filter, \$25. Hermosa Bch., 374-5425. A

Mercury Monterey, 1965, h/top, r/h, auto. trans., p/s, p/b, factory air cond., \$2750. Costa Mesa, 714-546-5341. A

Guitar, classical-type, Mexican import, \$60. Costa Mesa, 714-549-1760. A

Hi Fi, Webcor, 4-spd., auto., mahogany cabinet, \$19. Hollywood, 657-2642. A

Sofa, lux. Mediterranean, 9', olive green & black, quilted & Scotch Guarded, cost \$690; \$395. Marina del Rey, 823-2655. A

Crib, deluxe Edison, bow front, wax birch, plus Kantwet mattress in zipper cover, \$19. Torrance, 323-8089. A

Chevrolet, Super Sport, 1964 convt., V-8, 327 cu. in., 4-spd., r/h, new tires, \$1800. La Habra, 691-5166. A

Honda, 1965 CB160, less than 2000 miles, \$495. Redondo Bch., FR 8-5078. A

Wedding Dress, long, w/train, 8 mos. old, \$65. Long Bch., GA 6-6274. A

Buick Skylark, 1962 coupe, 8-cyl., 38,500, p/s, r/h, orig. owner, \$1325. Pac. Palisades, 474-4667. A

Console Hi-Fi, Dynaphone radio-phonograph-microphone-amplifier, for electric guitar, \$60. Hawthorne, 676-0418. A

Ford Fairlane, 1963 h/top, 2-dr., 263 h.p., standard trans., p/s, good w/w tires, take over \$52.50 mo. pymts., \$900. Downey, 923-2533. A

Chevrolet, 1956 station wagon, 4-dr., V-8 eng., p/b radio, hvy. duty heater, new w/w tires, battery & rebilt. trans., 1-owner, \$375. P. V. Ests., 375-3902. A

House, 3-bdrm., many custom features, landscaped, sprinklers, extra lge. gar., 1 1/2 miles from Ventura Division, \$22,500. Newbury Pk., 498-3043. A

Volkswagen, 1963 9-pass. bus, good condition, \$950. Lakewood, 633-6561, 630-4368. A

Poodle, silver, male, miniature, 2 yrs. old, housebroken, all shots, AKC papers, \$30. Long Bch., 596-9748. A

Range, O'Keefe & Merritt, gas, griddle grillervator \$60. Hawthorne, 679-2983. A

MG, 1958, wire wheels, needs minor body work, \$450. Torrance, DA 4-8663. A

House, 4-bdrm., fireplace, 1 1/4 baths, screened in alum. patio, unusual kitchen, Medallion home, fenced yd., 3 1/2 yrs. old, \$26,000. Torrance, 834-2175. A

Tube Tester, Hickok model 533P mutual conductance, \$22. Gardena, DA 4-7097. A

Car Radio, Motorola FM900, complete kit except for rear speaker, 1 1/2 yr. uncond. warranty, \$70. P. V. Pen., 377-7241. A

Volkswagen, 1965, push-out rear windows, 14,000 miles, \$1545. Inglewood, PL 6-7337. A

Pickup, 1964 Econoline, w/camper shell & new 14" prem. tires, \$1100. Lakewood, 865-8009. A

Olds F-85 Cutlass, 1963, p/b, p/s, w/w, radio, turbo Hydramatic, new tires, \$1595. Manhattan Bch., FR 2-4324. A

Refrigerator, GE, small freezer, \$30. Torrance, FR 5-2929. A

T-Bird, 1962, p/s, p/b, p/seats & windows, air cond., \$1850. Redondo Bch., 370-0157. A

Encyclopedia, Collier's, 1966 ed., 24-vol. & Junior Classics, 10 vol. reference service & Yearbooks until 1976, \$350. Hawthorne, 324-7698. A

Mobile Home, 10'x50', birch panelled int, fenced patio w/awning, ocean view, Coast Hwy. near Santa Monica, \$4500. Pac. Palisades, GL 4-3642. A

Volkswagen, 1964 sedan, w/w, radio, low mileage, \$1275. Inglewood, PL 4-6079. A

Ford, 1956, V-8, auto., smog control, \$65. Inglewood, OR 2-4828. A

House, 4-bdrm., family rm., 2 1/2 baths, 1 acre, horses OK, near Northrop Ventura, \$35,000. Somis, 805-482-1186. A

Mercedes Benz, 1963 220S, automatic, p/s, AM-FM radio, \$2650. Newhall, 805-259-2674. A

Room Cooler, portable, water circulating, 3-spd., 26"x18"x17", \$50. Rolling Hills Ests., FR 5-8778. A

Shopsmith, MK-5, w/jointer & dado, \$200. Hawthorne, 675-9068. A

For Sale

Acreage, near Willow Springs in Antelope Valley, East Kern Water Dist., 5 to 20 acres, \$495 acre. Torrance, FR 8-1026. A

Home, on 1/2 acre, 3-bdrm. & den, 2 fireplaces, covered patio, large pool, \$75,000. Rolling Hills, 532-5005. A

House, 3-bdrm., walking distance to Northrop, take over FHA 5 1/4% loan, lge. kitchen, service porch, lge. fenced backyard, landscaped front, R-3 zoning, near schools, \$23,500. Hawthorne, 675-9360. A

Shampoo & Polisher, Hoover floor-type, \$20. Torrance, 370-6734. A

Ford, 1959, business coupe, 6-cyl., standard trans., w/w, radio, smog device, recent trans. o/haul, \$250. Gardena, 676-0432. A

Home, G.I., 3-bdrm., 1 1/4 baths, fireplace, f.a. heat, near Crenshaw-Imperial shopping center & Morningside High, \$26,000. Hawthorne, PL 4-2049. A

Volkswagen, 1965, 16,000 miles, \$1550. Torrance, DA 5-7154. A

Chevrolet, 1958, station wagon, good mech. condition, large eng., new brakes, auto. trans., \$275. Wilmington, 834-4184. A

Chrysler Newport, 1965 2-dr. h/top, p/s, p/b, radio, b/seats, w/w tires, no equity reqd., orig. cost, \$4200; \$2450. L.A., 666-8948. A

Trailer, 2-bdrm., 12'x57', \$3500. Long Bch., 428-1789. A

Honda, 1962, 305 cc Super Hawk, low mileage, \$400. Long Bch., GA 7-4197. A

Sofa, 10', custom-made 4-cushion, never used, \$400. P. V. Pen., 377-7670. A

Volkswagen, fiberglass sport body, partially assembled, all fiberglass components necessary to finish, fits VW-1200 chassis only, \$400. Glendora, ED 5-1582. A

Camping Trailer, Ted Williams tent-type, used twice, \$275. Inglewood, 754-3582. A

Cabin, 2-bdrm., at Big Bear Lake, partially finished inside, \$10,950. Fullerton, 714-525-1677. A

Box Mirror, maple finish, \$20. Torrance, 371-5916. A

House, 4-bdrm., 2-story, 2250 sq. ft., fireplace, family rm., 2-bath, insulated, lge. patio, landscaped, fences, sprinklers, 1 1/2 yr. old, all bltins, assume 6 1/4% loan, \$2700 dn., \$30,000. Dominguez, 632-4978. A

Cooler, Bon-Aire, for home & auto, 6 volts, never used, \$25. Downey, TO 2-3310. A

Organ, Hammond M-3 spinet w/percussion, unmarred maple finish, \$795. San Pedro, 831-5837. A

Comet, 1962 sports model, b/seats, r/h, seat belts, \$725. Anaheim, 714-774-3310. A

Wanted to Buy

Tap Recorder, portable, high quality battery operated only. Box 1404. B

Typewriter, portable, must be in good operating condition. Long Bch., GA 3-1363. B

Rentals Offered

Vacation Cabins, Lake Gregory & Crestline, make reservations for July thru Sept., \$25 w/ends, \$60 wk. Venice, EX 1-2040. E

Apt, girl wanted to share 2-bdrm., furn., util. pd., \$65 mo. Hollywood, HO 4-1084, AT 4-5698. E

House, 3-bdrm., unfurn., gar., lease 1 yr., front yd. & patio, pets & children OK, \$150. Torrance, 654-1724. E

Duplex, lge. 2-bdrm., rear, unfurn., h/wood flrs., garb. disp., redecorated, fenced backyard, near schools & shopping, 1 child OK, \$90 mo. L.A., 755-0435. E

Rentals Offered

Apt, 1-bdrm., unfurn., redecorated, disposal, tile kitchen & bath, child OK, \$80. Hawthorne, OS 5-8335. E

Apt, 2-bdrm., garb. disposal, refrig. & stove incld., \$125 mo. Santa Monica, EX 2-2628. E

Apt, 1-bdrm., bltins, pool, \$95 mo. Redondo Bch., 376-2117. E

Cabin, Green Valley Lake, August reservations open, \$60 wk. Torrance, 324-9478. E

Cottage, Ocean Beach, San Diego, make reservations now, \$30 w/ends; \$60 wk. Buena Pk., 826-2007. E

Apt, deluxe 2-bdrm., furn., lge. pool, bltins, closed gar., near El Camino, \$140. Torrance, DA 9-5986. E

Apt, 2-bdrm., 2-bath, pvt. balcony, dishwasher, soundproof, air cond., sub. parking, fenced yd., children OK, \$155 mo. Inglewood, FR 5-0867. E

Apt, 1-bdrm., bltins, lge. sundeck, laundry rm., closed gar., 2 miles from Northrop, \$150 mo. Inglewood, 677-3994. E

Apt, deluxe 2-bdrm., bltins, near S. Bay Center, incl. all utilities, \$130. Redondo Bch., 374-5879. E

Apt, 1-bdrm., unfurn., \$150 mo. Hermosa Bch., 374-5267. E

Vacation Cottages, Idyllwild, sleeps up to 6, secluded, stream, patios, \$20-\$35 w/ends, \$50-\$60 wk. L.A., PL 4-5288. E

House, 2-bdrm., unfurn., drapes, h/wood floors, fenced yard & garage., avail. on or about Aug. 1, pets, children OK, \$120 mo. Inglewood, 677-7949. E

Lost

Watch, ladies' white gold Longines w/6 diamonds, white gold Kreisler corded band, June 30, 3:45 p.m. as leaving Gate 5 going towards Kornblum Ave. via Doty to 126th St., reward. Lost & Found, ext. 1972 or Hawthorne, 644-2845. J

Personals

Shirts, washed & ironed, .25c. Inglewood, 673-1284. L

For Sale or Trade

Volkswagen, 1963, many extras, 33,000 miles, 1-owner, \$1100 or trade for pickup truck of comparable value. Laguna Bch., 494-6940. M

Father-Son Team Wins Ping Pong Match

Ed and Dick Mosher, a father-son team, won the all-Northrop family table tennis tournament staged recently at Brookhurst school, Anaheim, by NRC.

Second-place doubles honors went to Jack and David Flannagan. Ten-year-old David was playing his first round of doubles in competition.

Mr. Flannagan copped the senior singles event, downing Miller Ching, Northrop's 1965 singles champ. Don Hall finished third. Junior singles honors fell to Bob Kirkeby with David Flannagan placing second.

AD ASTRA PER ASPERA

(Continued from page 4)

Moderator of the symposium was John R. Alison, a major general in the Air Force Reserve, a former AFA president and Northrop vice president—Customer Relations. Among his pertinent comments were:

"People have said that America doesn't know how to fight the kind of war we are facing in Vietnam. If we don't know, we are learning pretty fast.

"I think we should not forget that we wouldn't have a chance to learn how to fight this kind of war if it weren't for the strategic deterrent which we maintain.

"By that I mean if we did not maintain the strategic deterrent, the Communists would simply take over Southeast Asia.

"If the Communists are successful in making us forget the importance of this strategic deterrent in which America has unquestioned superiority, if they make us forget this for an instant, then the Communists have won a victory."

—Air Force and Space Digest

AIAA Aerospace Sciences

Several Northrop Norair men held key roles during the American Institute of Aeronautics and Astronautics' Fourth Aerospace Sciences Meeting (West Coast) held late last month in

Los Angeles.

William B. Fallis, chief of the Hypersonic and Lifting Entry Projects, chaired the opening sessions on Entry Vehicles. Janusz Stalony-Dobrzanski, a member of the technical management staff of the same organization, presented a paper titled "Effect of Trajectory Control Scheme on the Performance of Entry Vehicles."

Paul F. Jensen, jr., chief of Research Laboratories, teamed with Victor Zakky, professor of Aeronautics and Astronautics, and Alan Boss, a student, of New York University to present a paper titled "Laminar, Transitional and Turbulent Flow with Adverse Pressure Gradient on a Cone-Flare at Mach 10" during a session on Fluid Dynamics.

S. H. Levine, head, and R. Lepper, a member of the research staff of the Nuclear Sciences Laboratory, NSL, teamed on a paper titled "Analogue Studies of Magnetic Shields" presented at a Space and Atmosphere Physics session.

Richard E. Horner, Northrop vice president and Norair general manager and past president of the national AIAA organization, was invited to sit at the head table during a dinner session on the first day.

Richard A. Hachten, head of Public Relations at Norair, served as public relations committee chairman for the entire meeting.

Going my way?

Rides Wanted

7 a.m. — 3:42 p.m.

Pacific Coast Hwy. & Calle Mayor, Torrance. Want ride home only. Alexander Rosin, Norair, ext. 1446, FR 5-3077. 2

7:30 a.m. — 4:12 p.m.

Monterey & 8th St., Hermosa Beach. Penny Prouty, Norair, ext. 1456, 2015, 379-8990. 3

Paramount Blvd. & Florence, Downey. M. P. Wilson, Norair, ext. 1831, 923-7317. 3

8 a.m. — 4:42 p.m.

Torrance Blvd. & Anza or Anza & 190th, Torrance. E. Walter, Norair, 371-1420. 5

Figueroa (Harbor Fwy.) & Anaheim, Wilmington. Tom Henrich, Norair, ext. 2425, 835-9070. 5

Belflower & Stearns, Long Beach. Occasional ride wanted. Don F. Kesler, Norair, ext. 2061, 596-3691. 5

Harvester Rd. & Busch Dr., Malibu. Except Monday & Friday. Eligio M. Roque, Norair, ext. 2561, 457-7483. 5

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8 a.m. — 4:42 p.m.

Belflower & Stearns, Long Beach. Occasional ride offered. Don F. Kesler, Norair, ext. 2061, 596-3691. 15

Harvester Rd. & Busch Dr., Malibu. Except Monday & Friday. Eligio M. Roque, Norair, ext. 2561, 457-7483. 15

WINNER

(Continued from page 2)

are Elizabeth Johnson, Corporate office receptionist; Shiuzo Kitahata, a Norair machinist; Carl Cannon, Norair numerical control machine operator; and Frank Macias, a research biochemist at Northrop Space Laboratories.

Plans for the booklet were formulated at a "Plans For Progress" Vocational Guidance Institute held in 1965. William Larrabee, Northrop vice president-Industrial Relations, was chairman of the industry committee which set up this Institute. Mr. Scott was highly instrumental in organizing the Institute and a subsequent one which ended early this month. He also worked on gathering and preparing information for the booklet.

Northrop Corporation, an early signer of the "Plans For Progress" declaration, has continued to support this vital effort since late 1961. Included was financial assistance for making the two Institutes possible and the publication of "You Too Can Be a Winner."

NSL Picked For Mariner Negotiations

Northrop Space Laboratories has been selected for final negotiations to design, develop, fabricate and test the engineering mechanics subsystem for the Mariner Mars 1969 spacecraft.

This includes parts of the structure, flight electrical cabling, mechanical devices and temperature control subsystems.

The contract value has been estimated at approximately \$5 million.

Phases I and II will begin on August 1, Program Manager Robert Munk said.

A portion of Phase I will entail preliminary design work, to be done by Northrop personnel at the Jet Propulsion Laboratories (JPL). JPL is the primary contractor as designated by the National Aeronautics and Space Administration (NASA).

The detail design portion of Phase I will be done at NSL, Mr. Munk said.

The fabrication of a mockup and a prototype for design verification will also be completed at NSL, he said.

Phase II, the fabrication, assembly and testing of the flight hardware subsystems, will be carried out at NSL and at Norair, with final delivery to JPL, Mr. Munk said.

Phase I is a three-year contract. Phase II is an 18-month contract.

It is possible to work on both phases at the same time, Mr. Munk said, because some portions of the Mariner Mars '69 spacecraft are identical to those used in the 1964 Mariner Mars probe.

Northrop was one of 14 firms solicited for proposals.

Three companies entered the competition for the contract.

VWS Proves Value in Tests On Helicopters by Army

The effectiveness of a voice warning system in making less hazardous low-level helicopter missions such as those in Vietnam was successfully demonstrated in recent Army flight tests at Fort Rucker, Alabama.

During a three-month evaluation program to determine the applicability of the voice warning concept of malfunction reporting to specialized Army air missions, five Mark I NORVIPS systems developed by Northrop Nortronics logged about 1500 hours aboard tactical and medium transport helicopters and a twin engine surveillance aircraft.

Because low altitude airmobile operations demand extra pilot concentration on external terrain, NORVIPS proved particularly significant in reducing the amount of attention normally required to monitor or interpret potential problems.

In addition, the NORVIPS tests revealed that some indications of system failure which normally would prompt the pilot to make an auto-rotation landing were in fact only instrument failures.

The Mark I NORVIPS is an



WOMEN IN PLASTICS—Mary Gates (right), first woman supervisor in the Plastic Products branch at Northrop Ventura, examines a fiberglass cooling duct for the F-5 being built by Kay Low. Mrs. Gates has been with Ventura for 10 years.

Nortronics Delivers 50:1 Dynamic Range Zoom Lens

A 50-to-1 dynamic range zoom lens, the latest and most powerful in a series of optical zoom systems, has been produced by Northrop Nortronics.

The first 50:1 system has been delivered to the Boeing Company, Kent, Washington, for its electro-optical guidance simulator which tests the accuracy of missile homing devices. The Northrop Nortronics' zoom lens projects target images on the screen at 4 to 200 times the normal size of the images on the film during the simulated missile strikes.

The zoom lenses are completely optically compensated systems, with only one moving part. Con-

ventional systems are mechanically compensated and require many moving parts.

Images are kept in focus at all times during the zooming operation with the Nortronics system, and the deterioration of parts due to wear is eliminated.

The 50:1 system includes a 2500-watt xenon light source for illumination with a movable condenser system which fills the entrance pupil of the zoom lens at all magnification ranges.

The lens is 57 inches long, the illumination system housing is 24 inches long and the distance from film to screen is about 11 feet.

NVRC ROUNDUP

San Diego Rallye Set By Sports Car Buffs

A mid-August rallye to San Diego is being planned by members of the Northrop Ventura Sports Car Club, Commissioner Russ Opfer has announced.

An exact time and date may be set next month when the group meets at the home of one of its 20 members. Information about the meeting may be obtained by calling Mr. Opfer at ext. 285.

Mr. Opfer recently returned to Northrop after two years of active duty in the Army. Among the members' cars are Triumphs, Volkswagens and a Porsche.

"Ownership of a sports car isn't necessary to belong to the club," Mr. Opfer said. "Most of the rallyes are based on navigation, and the Volkswagens do very well in that."

One former member, Mr. Opfer said, won several rallyes in a 1947 Ford half-ton pickup truck.

"Some of the sports car owners got a little perturbed about that," Mr. Opfer said, "but she still kept winning."

Marksmen Dine First, Blast Targets Later

An estimated 40 to 50 members of the Northrop Ventura Rod and Gun Club met for a cookout breakfast this month, preceding one of the group's two monthly trap shoots.

The July 9 breakfast was held at Chatsworth Park, Commissioner Dorothy Prychoda said. Earl Muehlenbach was chairman.

Following the breakfast, the club went to the Agua Sierra for its regular shoot. The matches are held on alternate Saturdays.

VENTURA CLUB BOOKS DEEP SEA CHARTERS

Two deep sea fishing trips aboard the Alicia sailing from San Diego have been booked by the

Northrop Ventura Rod and Gun Club.

The first will be this weekend and reservations were due to have been confirmed July 15. Openings are still available for an August 21 trip with confirmation due by August 12.

Venturans may board as early as 11 p.m. the previous night with departure set for 2:30 a.m. The cost is either \$15 or \$18.50 per person, depending upon whether the quest is for yellowtail or albacore.

Contact Harry Caseldine, ext. 1080, for reservations.

Still to Discuss Book At Writer's Workshop

Henry Still, Northrop Ventura Public Relations manager, will speak at the August 2 meeting of the Northrop Ventura writer's workshop.

The meeting will take place from 5 to 6 p.m. in the cafeteria.

Mr. Still will discuss his recently published book, "Will the Human Race Survive?" and will trace the progress of the book from initial idea to publication.

Marian (Sam) Weller, Mr. Still's secretary, spoke at the July meeting of the Club, reading selections of poetry she has written.

CURTAINWALL

(Continued from page 1)

state, is recoverable.

One part of the process, high intensity quartz lamp heaters, was developed by Norair's Manufacturing Research and Development section.

Pacific Curtainwall (NORTHROP NEWS, September 8, 1965) has participated in such projects as the Los Angeles Music Center, Los Angeles Department of Water and Power Building and other architectural efforts on an international scale.

The metal and glass portions of Northrop Norair's Engineering and Science Center walls were a major effort of the firm in 1957, before it joined the Northrop family in 1961.

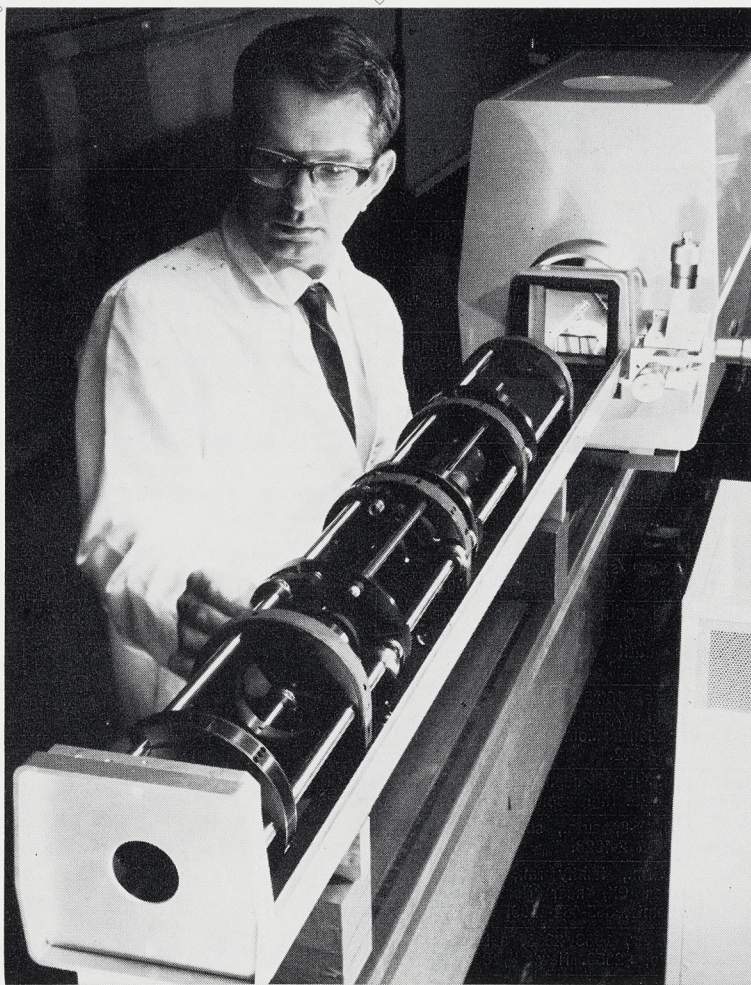
The company has offices in San Francisco and Honolulu and is represented by construction firms in 11 Western states, Alaska, Japan, Norway, France and Spain.

Ventura Families Attend Open House

Wives, children and friends of more than 150 Apollo Program employees at Northrop Ventura attended a recent open house tour of Apollo facilities at the Conejo Valley facility.

The guests were shown motion pictures of the Apollo Earth Landing System development, saw a model of the spacecraft, had lunch with employees and attended a question and answer briefing on the program.

The program was held on June 30 and July 1. W. A. Steyer, program manager, addressed visitors on June 30. S. D. Downey, deputy manager, spoke on July 1.



ZOOMING OPERATIONS—Nortronics-produced 50-to-1 dynamic range zoom lens above has only one moving part, was delivered recently to Boeing Company for use with electro-guidance simulator which tests accuracy of missile homing systems. Earl Cornwell is the operator above.

NORTHROP NEWS

NORTHROP VENTURA

Published biweekly by Northrop Corporation, Beverly Hills, California

Vol. 24, No. 15

August 3, 1966

Contract Won For Poseidon ATE Units

Northrop Nortronics has received a contract in excess of \$10 million to develop automatic test and readiness equipment for the U.S. Navy Poseidon missile.

Under the award from Lockheed Missiles and Space Company at Sunnyvale, Calif., prime contractor for the submarine-launched deterrent weapon, Nortronics Anaheim will design checkout systems for missile testing both on land and at sea. The cost-plus-incentive-fee contract, covering a period of approximately 40 months, includes hardware manufacture and test.

Two basic systems, similar to those designed and built by Northrop Nortronics for checkout of the Polaris ballistic missile, will be developed. One will go aboard the submarines for missile systems test to verify Poseidon's operational readiness, and the other will be used for factory and tender ship testing of both components and systems.

Poseidon is being developed to supplement the Navy's fleet of nuclear-powered submarine weapons systems, and will have at least twice the accuracy and payload of a Polaris. A mixed force of both types of missiles is planned for the 1970's.

MDTA Group Tours Plant, Sees Film

Twenty-eight men, studying under the federal Management Development Training Act, have toured operations at Northrop Ventura.

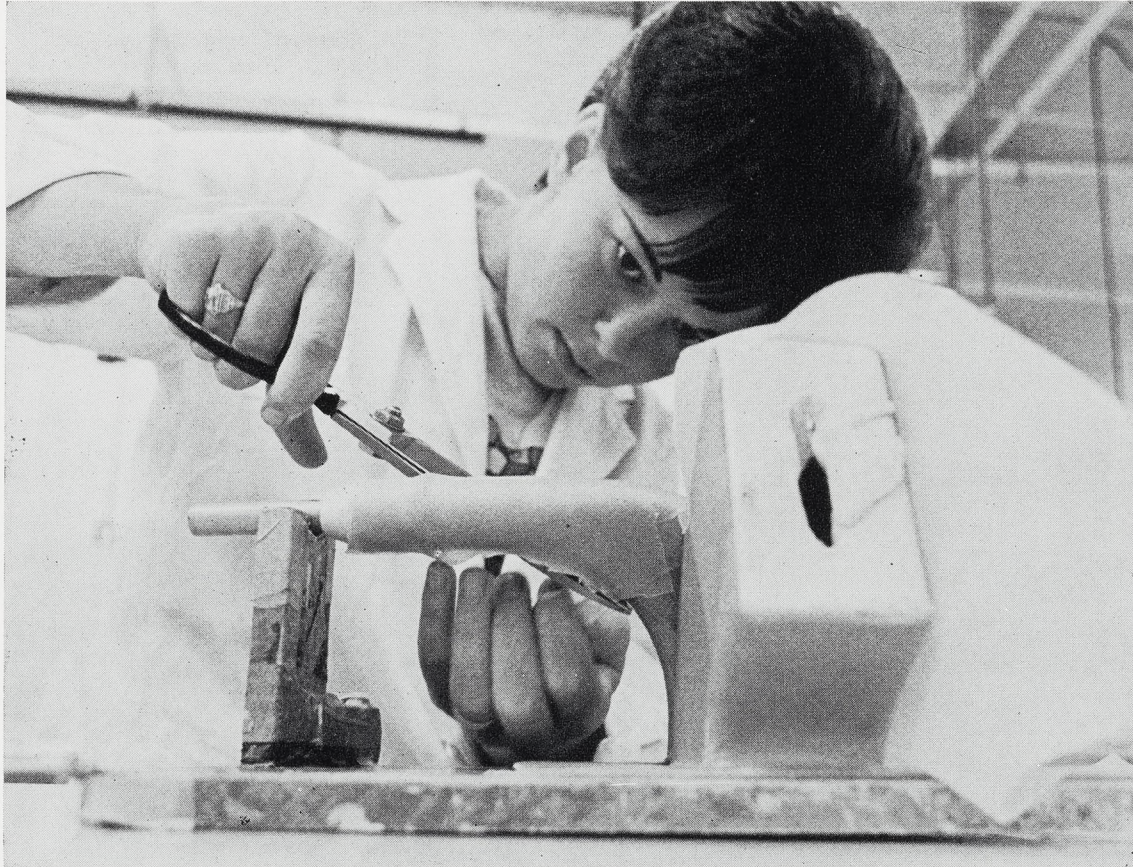
The men, who study at Ventura Unified High School, were shown the movie, "The Last Five Miles Home," which explains Northrop's part in the Apollo Program.

They toured the machine shop areas, parachute fabrication rooms, drone manufacturing areas and the plastics shop.

With them was their teacher, Al Robinson, a former Northrop Ventura employee.

It was the second MDTA group to be guest of Ventura this summer.

A CLOSE LOOK AT PLASTICS



Linda Wagner of the Plastic Products branch at Northrop Ventura looks closely at a sheet of polyester plastic she is using to make a cooling duct for the F-5 jet. Plastic Prod-

ucts turns out many parts for the F-5 and T-38. The branch also provides assemblies for the Ventura-built drones, and does contract work for other agencies.

PUPPETS, CLOWNS AMONG FEATURES OF NVRC PICNIC

Children will watch puppets and clowns, at the annual Northrop Ventura employees' picnic, to be held Saturday, September 24, at Vasa Park in Agoura.

The picnic, from 10:30 a.m. to 5 p.m., will be sponsored by the Northrop Ventura Recreation Club. The event is open to employees and their families.

Johnnie Via, NVRC Council president, said children—in addition to seeing clown acts and puppet shows—also will be able to take part in pony rides, a merry-go-round and other rides.

In addition, a registered nurse will be present.

Hot dogs, hamburgers, soft drinks, popcorn and other items will be at the catered picnic, but employees may bring their own food and beverages, Mr. Via said.

The 1965 Northrop Ventura picnic also was held at Vasa Park.

NSL Designing Hand Drill For Possible Lunar Use

A battery-powered drill capable of boring nearly 10 feet into the moon's surface is being designed by Northrop Space Laboratories.

The drill, which will weigh approximately 15 pounds so it can be operated by one man, is being designed under a \$75,000 contract awarded to NSL by the National Aeronautics and Space Administration's Manned Spacecraft Center, Houston, Texas.

The three-month design study will be completed late in August, Program Manager John B. Gustavson said. A fully projectized organization has been established within NSL to assure undivided attention to the design study during the critical definition phase. Mr. Gustavson came to NSL from a project engineering assignment on the Surveyor spacecraft at NASA's Jet Propulsion Laboratory.

The drill, under NASA specifications, would be carried in the Apollo's Lunar Excursion Module (LEM), and could be taken from the ship by an astronaut as desired.

NASA plans call for Apollo astronauts to use the drill to obtain core samples of the moon's crust, and to drill holes in which data-gathering instruments would be placed.

Holes drilled by the proposed tool will be about an inch in diameter. Since core samples are to be saved for biological study and chemical analysis, the drill bits must be hollow, Mr. Gustavson said. Design ingenuity is required to develop a method to retrieve the core samples without contaminating them with earth-based microorganisms.

Mr. Gustavson said NASA specifications call for a drill powerful enough to cut through three feet of granite in 20 minutes.

"The lunar surface may or may not be that hard," Mr. Gustavson said, "but NASA has specified a capability for cutting through various materials ranging from featherweight pumice stone to dense granite."

Project officials said that early designs indicate the drill may look much like a conventional power drill, except for the lengthy bit. It will employ two types of motion — percussive (like a jack hammer) to crush the hard rock; and rotary (like a conventional drill) to remove the rock chips from the hole.

The design study is labeled Phase "C" by NASA. Phase "D", to be awarded following evaluation (See LUNAR DRILL, page 6)

Construction Date Nears For Offramp

The State Department of Highways has now called for bids for the construction of an additional offramp from the northeast side of the Ventura Freeway onto Borchard Road-Rancho Conejo Boulevard, near Northrop Ventura.

The bids will be opened on August 18, highway officials said.

The additional offramp, when completed, will permit westbound traffic to leave the freeway and go north onto Rancho Conejo Boulevard without having to cross Borchard Road-Rancho Conejo Boulevard from the west.

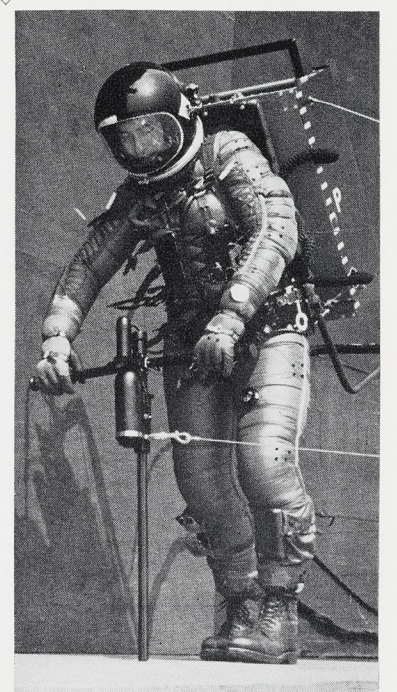
At the present time, the one westbound offramp has a 180-degree turn, doubling back to Borchard Road-Rancho Conejo Boulevard. Drivers have normal southbound access to the Borchard Road overpass, but must cross over the southbound lane of Borchard Road traffic to go north toward Northrop Ventura.

Construction is scheduled to start in November.

Congestion has temporarily been intensified at the present Rancho Conejo Boulevard offramp, because highway officials have closed the Ventu Park access road, about a half-mile east of Rancho Conejo. The westbound freeway turnoff at Newbury Road is still open.

The Ventu Park exit was closed for construction of an overpass there, highway officials said.

Over a year ago, Northrop officials asked the Highway Department to open, for temporary use, an existing secondary road which runs parallel to the north side of the freeway, just east of the Borchard Road overpass. But Highway Department representatives said that storm drain and surveying problems precluded the use of the secondary road, even on a temporary basis.



Early prototype model of the Northrop Lunar Drill is undergoing test in the NSL one-sixth "g" simulator facility to insure that the Apollo astronauts will be able to control the drilling process.

'BILGE IN THE CREW'S QUARTERS'

Norvips' Voice a Real Charmer

Picture an attractive professional singer, walking to the microphone in a broadcasting booth.

She adjusts the microphone, glances at a sheet of paper in her hand and says:

"High bilge in the crew's quarters. High bilge in the crew's quarters."

That's a more-or-less typical "recording session" for Joan Ririe, one of the voices of Nortronics' NORVIPS Voice Warning Systems.

Mrs. Ririe, a Torrance housewife, has made the warning recordings for NORVIPS for nearly four years. She was picked for the job when a professor at Pepper-

dine College, where she was studying, told her that Nortronics wanted to hire a woman with a bachelor of arts degree in speech.

Mrs. Ririe went to Nortronics-Palos Verdes, where she and about 200 other job candidates recorded their voices, warning pilots of potential hazards.

She was picked for the job after psychologists and human factors experts decided her voice would be most effective.

Mrs. Ririe's voice, recorded on tapes for submarines, planes, helicopters and artillery systems, has become quite familiar to servicemen, and particularly to pilots.

"One pilot told me that when-

ever he has to go across the country by himself, he turns on the NORVIPS system so he'll have company," Mrs. Ririe said.

"Sometimes the military and technical terms can be a little confusing. If I don't understand something, I just look for someone who does."

Her voice has been heard on Naval planes and submarines, Air Force B-58's and many other aircraft.

Some pilots who got used to hearing the friendly NORVIPS voice wanted to know who it belonged to.

So Mrs. Ririe, through Nortronics (See NORVIPS, page 6)

SECOND FLIGHT COMPLETED

Re-entry Vehicle 'Unqualified Success'

"An unqualified success."

This was Milton Thompson's ample description of the second flight test of the Northrop-built M2-F2 lifting body carried out July 19.

Mr. Thompson, chief lifting body pilot for NASA's Flight Research Center, was at the controls July 19 as he was one week earlier when the M2-F2 became the first manned all-metal lifting body ever to fly.

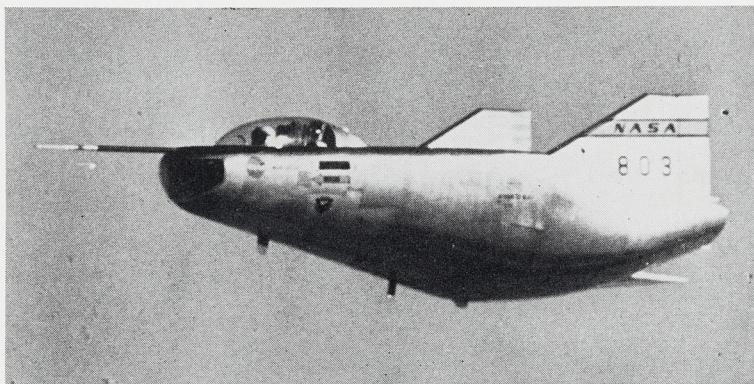
Air launched from a B-52 mother ship flying at 45,000 feet above Boron, California. Mr. Thompson put the M2-F2 through a left turn as he passed through 27,000 feet. Four minutes after launch he touched down on the runway on Rogers Dry Lake Bed in a 200-mile-per-hour powerless landing.

Primary purpose of the second flight was a complete systems checkout of the vehicle and to evaluate lateral stability. During the flight, Mr. Thompson performed several aileron maneuvers with some of the electronic control dampers intentionally turned off.

The M2-F2 is the first of two lifting body vehicles built by Northrop for NASA's use in investigating in-flight factors needed for a technological base for the design of future manned spacecraft. The HL-10 is currently at the Flight Research Center where it is undergoing final routines prior to its first flight.

Following his first flight, and just one day before he made his second flight, Mr. Thompson voiced some personal and gratifying praise for the role Northrop and its people have played in developing the two lifting bodies.

Mr. Thompson noted in a letter to Northrop that the first flight of the M2-F2 was, in his opinion, extremely successful.



M2-F2 IN REPEAT SUCCESS—One week after its initial flight, the Northrop-built M2-F2 lifting body sweeps down to a powerless landing under steady hand of NASA Pilot Milton Thompson in its second flight. Below are Norair men who played key role in the development of M2-F2 and the HL-10, Dr. Leonard Fowell, manager (left) and Ralph Hakes, director, of the M2-F2/HL-10 Program department.

"At the rollout ceremonies of the M2-F2 last year, each of the project people and Mr. Bikle (Paul Bikle, director of the Flight Research Center) expressed approval of the vehicle and the workmanship visibly apparent," Mr. Thompson wrote.

"As a pilot, I was also impressed but of necessity had to reserve judgement until after a flight. Now that I have made

a flight, I can sincerely say I am impressed. Prior to launch, all of the vehicle systems checked out perfectly, including those supplied or energized from the B-52 through the M-2 adaptor (developed and built by Northrop). At launch, there was not even a momentary interruption of the function of any system, and everything worked as advertised throughout the remainder of the flight.

"More significant, however, than anything I can say about the vehicle, is the fact that we are scheduled for another flight tomorrow (July 19). No changes, modifications, or fixes were considered necessary or made to the vehicle prior to scheduling of the second flight.

"I certainly am impressed with your product and the people who were responsible for the design. I enjoyed working with all of them during the design phase and can not say enough about Mr. (Ralph) Hakes' (Northrop's director of the M2-F2/HL-10 effort) and Mr. (F. R.) Erb's (responsible for mechanical and structural design) contribution to a successful first flight."

Lupe Zuniga Garners Another Stage Role

Lupe Zuniga, a Northrop Ventura secretary, portrays Tuptim, one of the major figures in *The King and I*, which began last weekend at the Plaza Players Theater in Oxnard.

It will be her fifth production with the Plaza Players. Miss Zuniga has been appearing in light opera for more than six years.

As Tuptim, she sings two solos, "Lord and Master" and "I Have Dreamed," and a duet, "We Kiss in a Shadow."

Miss Zuniga attended Pierce College in Woodland Hills for two years, majoring in music.

The show began Thursday and will play every Thursday, Friday and Saturday through August 6. Tickets may be obtained by calling Miss Zuniga on extension 392.

IN VIETNAM

First F-5 Pilot Logs 500 Combat Hours

On his 36th combat mission over Vietnam, Major William H. Gillette, 35, Proctorville, Ohio, became the first Air Force pilot to log 500 hours in the F-5 "Freedom Fighter" while flying a combat sortie.

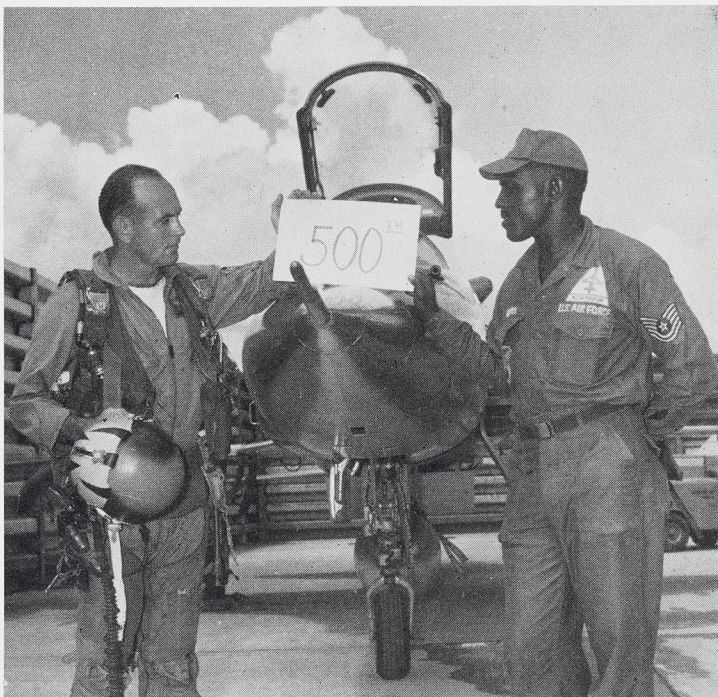
Assigned to the 10th Fighter Commando Squadron of the 3rd Tactical Fighter Wing at Bien Hoa Air Base, Major Gillette passed the mark on a flight against a Viet Cong concentration in the Mekong Delta, 35 miles southwest of Saigon.

Major Gillette arrived in Vietnam on May 14 after spending two years as one of the original F-5 flight instructors at Williams Air Force Base, Arizona.

"I taught many foreign instructors how to fly this aircraft. We had pilots from Iran, Korea, The Philippines, Nationalist China, Turkey, Ethiopia, Morocco, Thailand, Greece, Norway and Canada. I also checked out a number of senior officers in the bird," remarked the Major.

Commenting on the F-5 in Vietnam, he added, "In combat, the aircraft is a dream. It responds beautifully. On May 25 I was on a flight that was diverted from deep in the delta to Nui Ba Den, 53 miles northwest of Bien Hoa, where a special forces camp was under attack.

Story and photo by USAF



F-5 PILOT HITS 500TH HOUR—Major William H. Gillette (left), F-5 pilot with the 10th Fighter Commando Squadron of the 3rd Tactical Fighter Wing at Bien Hoa AB displays Hour Number 500 to his crew chief, TSgt. Haywood Cormier. The 35-year-old fighter pilot from Proctorville, Ohio, became the first Air Force pilot to log 500 hours in the "Freedom Fighter" while flying combat in Vietnam.

"The speed with which we were able to respond, plus the ability of the aircraft to turn tight enabled us to strafe 12 times in a few minutes and turn back the attackers. Our flight accounted for 32 VC killed by air, and the attack was repelled."

Major Gillette mentioned a remarkable aspect of the logging of his 500th hour.

"When I returned from the mission I was met by the same crew chief who met me after my first hour in the F-5, some two years earlier. He is TSgt. Haywood Cormier, 34, of Morris-town, Pa., and as far as I'm concerned, one of the finest in the Air Force. We were at Williams together and he arrived here about two weeks after I did."

The Major joined the Air Force in 1951; has flown a wide variety of aircraft, including the T-6, F8U, T-33, F-94, P-51, F-86, F-100 and the F-5. He also has 19 Atlantic Ocean crossings to his credit.

His wife, Jackie, currently lives in Mesa, Arizona. They have four children, twin daughters, Pennie and Billie, age 8, and sons, Triston, 7, and Bob, 3.

Major Gillette's parents are Mr. and Mrs. R. P. Gillette of Proctorville, Ohio.

Gurnee Appointed Staff Assistant to Thomas V. Jones

William H. Gurnee, jr., has been appointed staff assistant to the president of Northrop Corporation, it has been announced by Thomas V. Jones, Northrop president.



Mr. Gurnee

Mr. Gurnee served in Washington as executive officer to three Assistant Secretaries of the Army between 1958 and 1963 and will act in a similar capacity in the office of the president at Northrop.

Mr. Gurnee was assistant to the senior vice president of Northrop, September 1963 to November 1964, and since then has been with the Logistics Management Institute as senior project director in charge of procurement studies.

He is a graduate of the United States Military Academy at West Point, 1941, the Harvard Business School, 1947, and the Industrial College of the Armed Forces, 1957. Mr. Gurnee retired from the Army with the rank of colonel in 1963.

BOARDS APPROVE ACQUISITION OF HALLICRAFTERS

The boards of directors of Northrop Corporation, and The Hallcrafters Company, have approved Northrop's proposed acquisition of Hallcrafters, the two companies recently announced.

Northrop will acquire substantially all of the assets and the liabilities of Chicago-based Hallcrafters for a price of approximately \$13,500,000, subject to completion of an audit in progress, and payable in 385,195 shares of Northrop preferred stock to be issued for the purpose. The purchase price has been reduced from previous figures and reflects a re-estimate of the cost to complete certain contracts.

On this basis, public shareholders of Hallcrafters will receive one share of the new Northrop preferred stock for each approximate 5.6 Hallcrafters shares owned. The members of the Halligan family, who own 50.47 percent of the outstanding Hallcrafters stock, will receive one share of the new Northrop preferred for each approximate 8.1 Hallcrafters shares owned. The Northrop preferred annual dividend rate will be \$1.45 per share.

The transaction is scheduled to be completed following necessary approvals by shareholders of both companies at meetings to be held December 13, 1966.

"We are convinced that there are excellent and growing market opportunities for Hallcrafters programs and products," Thomas V. Jones, Northrop president and chairman, stated. "In addition Northrop's own communications activities will be complemented and strengthened by the Hallcrafters' business, and

(See **BOARDS**, page 5)

Fortnight in Review

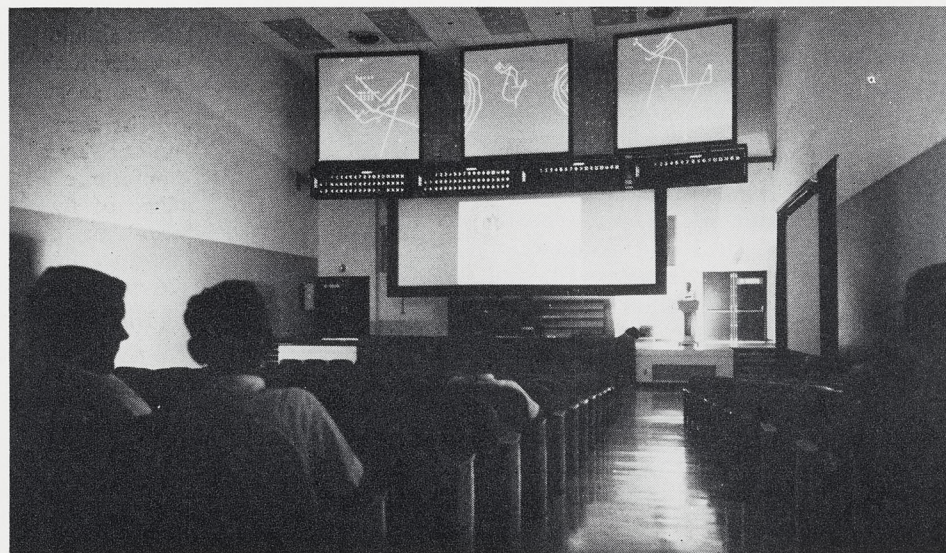
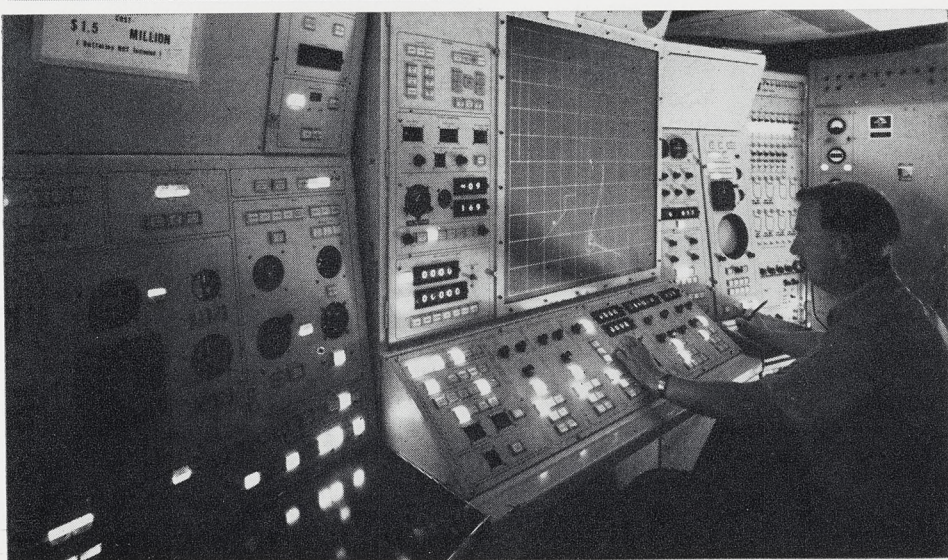
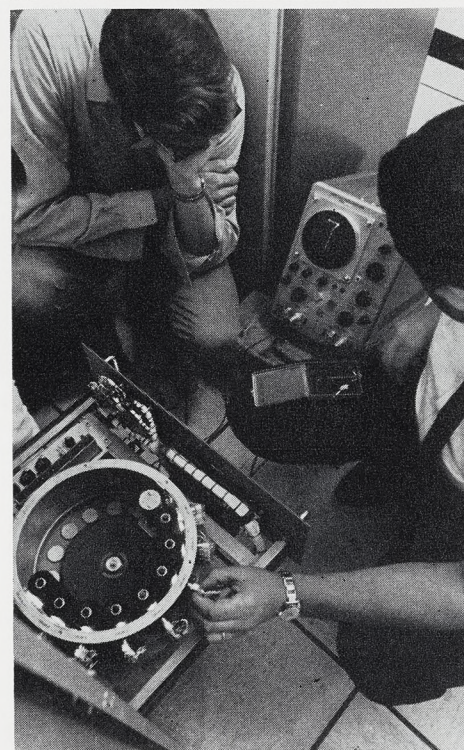
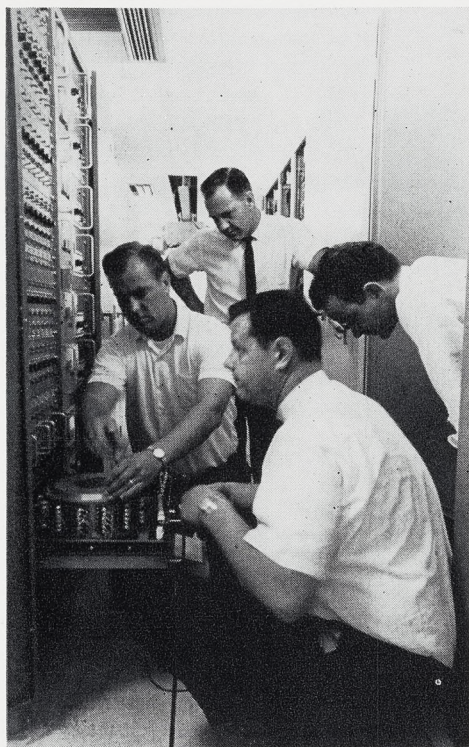
Kudos For Firemen

What was left of Northrop Norair's historic Plant 3, which was being demolished as part of a modernization program, went up in flames (left and right), but not before the City of Hawthorne Fire Department distinguished itself with an outstanding fire-fighting effort. Not to be overlooked was the prompt, efficient response by Norair's own fire-fighting specialists. The fire, July 20, began among piles of rubble when a tractor hauling a wooden beam with nails in it apparently scraped over a concrete parking lot, causing sparks. Hawthorne Fire Chief William Hartzell directed the fire fighting. Speaking of fires, Northrop Ventura's Fire Brigade recently put into operation a new emergency pump (below, right), which could draw water from ponds around the plant if needed. On the more pleasant side (below), Northrop's entry in the Hawthorne Community Fair parade won first place in the commercial category.



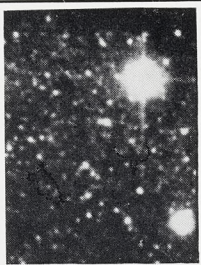
Graphic Information at Fingertips

Nortronics personnel joined with Navy and Lockheed officials recently in checking out the newly installed Vigicon system at the Navy's Anti-Submarine Warfare School in San Diego. At left, Nortronics' Chuck Blaney (top) and John O'Connor (bottom) inspect a symbol generator with officials from Lockheed Electronics Company of Plainfield, N. J. At lower left, a Navy operator scans the Vigicon screen, which simulates the movement of ships, submarines and aircraft. At lower right, Nortronics men attended a briefing on the Vigicon equipment at one of the Anti-Submarine Warfare School's three theatre-type screening rooms. And at right, a Lockheed technician checks out the wiring on a symbol generator. The San Diego Vigicon installation includes 24 projection units. A similar Vigicon center is at Naval facilities in Norfolk, Va. A new application for Vigicon is at the Navy's first underwater test range in the Bahamas. Vigicon simulations include telemetry signals, communications transmissions, photographic material and computerized inputs.



AD ASTRA PER ASPERA

National, Local AIAA Installs Executives, Honors C.W. Eyres



By the Northrop News Staff

Four Northrop Norair men have been named to national committees and a fifth honored with a special award by recent action of the American Institute of Aeronautics and Astronautics (AIAA).

Charlie Eyres, assistant to the vice president and assistant general manager-Technical, received a "Certificate of Distinguished Service" from the Los Angeles Section of AIAA. It was the first award of its type made by the AIAA and went to one of its most active members. Mr. Eyres has been chairman of the engineering career development committee, secretary of the Los Angeles Section of AIAA and was chairman of two national meetings committees. Last year he was honored for his national educational efforts on behalf of AIAA.

Welko Gasich, Norair vice president and assistant general manager-Technical, is now serving on the important AIAA national Technical Advisory Committee as advisor for aircraft.

Milt Kuska, Norair deputy assistant general manager-Technical, was elevated this year to the chairmanship of the national Management Technical Committee of AIAA.

William Fallis, chief of the Norair Lifting Entry Systems group, was also moved up as chairman of the AIAA Re-entry Vehicles Committee.

Herb Cooles, Norair Research Laboratories Design branch, is a member of the AIAA Technical Committee on ground testing and simulation.

Messrs. Eyres, Gasich, Kuska, Fallis and Cooles, along with many other Northrop Cor-

poration employees, have long been active in AIAA activities.

Mr. Eyres received his award from Win H. Arata jr., outgoing Los Angeles Section chairman. Mr. Arata is a member of the Northrop Corporate Marketing staff. H. F. Mark, assistant to the manager of Marketing at Norair, was installed as the new Section treasurer, and George F. Douglas, Corporate vice president and general manager at Northrop Ventura and a former national committeeman, was named a member of the Section Executive Committee.

Taylor Heads Alabama AIAA

Ted B. Taylor, assistant to the manager of Northrop Space Laboratories in Huntsville, is the new chairman of the Alabama Section of the American Institute of Aeronautics and Astronautics.

Mr. Taylor, who was installed less than two months ago as vice chairman, succeeds B. F. Beckelman as head of the AIAA's Alabama Section. Mr. Beckelman recently left the Huntsville area, thus creating the vacancy which Mr. Taylor fills.

The new chairman has been associated with Northrop for a year and one-half. He previously was with General Dynamics Corporation as a corporate representative and an electronics engineer. He also served as a research assistant at Georgia Institute of Technology, where he graduated with a B.S. degree in electrical engineering.

Mr. Taylor is an associate fellow in the AIAA and served as secretary to the Alabama Section for two years prior to his election as vice chairman. He also is a member of the Institute of Electrical and Electronic Engineers and the Armed Forces Communications and Electronics Association.

The Alabama Section of AIAA is the largest technical society in the state. Its 1100 members include many senior aerospace scientists and engineers in both government and industry.

* * *

Radiation Effects

Scientists from the Nortronics Applied Research department (NARD) in Conejo Valley have presented four papers at the annual Institute of Electrical and Electronics Engineers convention on Nuclear and Space Radiation Effects.

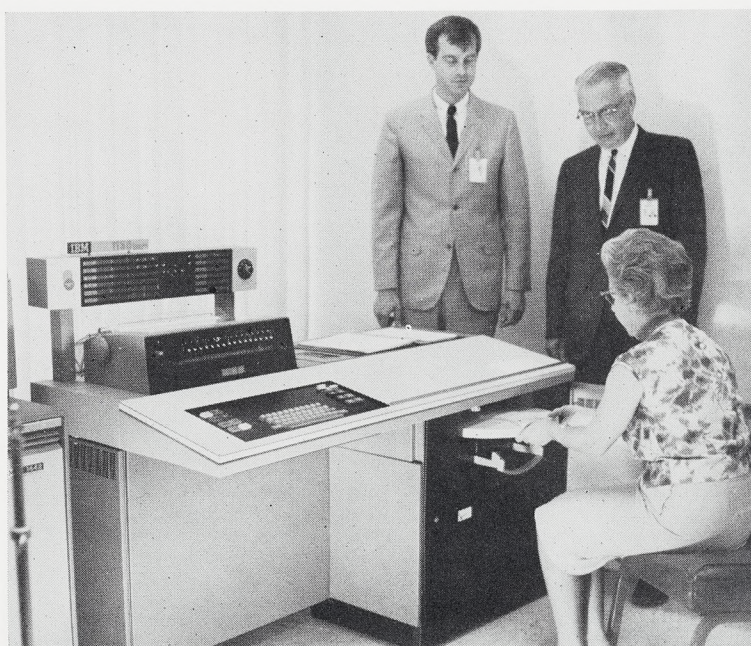
The five-day conference (July 18 through 22) was held at Stanford University in Palo Alto.

The four papers were among 45 presented from more than 150 which had been submitted

(See AD ASTRA, page 5)



Charlie Eyres (left) receives AIAA certificate of distinguished service from Win Arata.



IT'S THE FIRST—Mrs. Mary Cooper inserts data into an IBM 1130 computer at Northrop Space Laboratories Huntsville department, the first IBM 1130 in the Huntsville area. It was recently delivered. With her are J. A. Barclay (right) Huntsville manager, and Fred Roberts, programming coordinator.

NSL Huntsville Installs IBM Computer System

The first IBM 1130 computer system installed in the Huntsville area was recently delivered to the NSL/Huntsville department. There it will serve the needs of the department for business data processing as well as supplement the more sophisticated computing capability available at the Computing Lab of Marshall Space Flight Center (MSFC).

This is the first 1130 system being programmed for data processing, and it is expected to provide valuable time and expense saving services to all departments.

Designed specifically for engineering companies and research laboratories, the IBM 1130 is suited for applications requiring mathematical calculations and statistical analysis as well as scheduling, engineering design, and job cost reporting.

Fred Roberts, formerly an engineer in the Research and Analysis section, was given the assignment of analyzing advantages of an in-house computer, determining the type of computer suited to Northrop needs and obtaining the computer.

According to Mr. Roberts, the computer will eliminate the time lag involved in communication between Hawthorne and Hunts-

ville in accounting matters and will diminish book work in the Finance department. It will minimize man-hour and travel expenses accumulated in trips to the Redstone Arsenal where all computing was previously performed.

The ability to tailor machine and user priority to contractual needs, rather than merging Northrop requirements with those of MSFC and various Huntsville contractors, is expected to be the most significant advantage.

Standard accounting formats prepared to date include employee payroll and insurance details, Savings Plan and bond purchase reports, labor distribution details, and cost accumulation under various contracts. Projected plans for the computer in the areas of contract and study reports include processing of data on manpower requirements for job assignments; progress made to date under various contracts to determine problem areas; and new study methods.

The computer will also serve as a valuable aid to management in project forecasting and in determining plans to use for contract bidding.

ANALYTICAL COMMUNICATION

Portrait of a Sentence as an Engineering Problem

Many sound technical concepts never see the light of day because the conceiver cannot make himself understood to others, says Professor Sidney W. Wilcox of Arizona State University.

Professor Wilcox is presently conducting a 12-week course in technical communications for 90 engineers, scientists, and proposal writers who work at Northrop Space Laboratories.

On the other hand, he added in a recent interview, there are people who have locked in their minds the knowledge to solve technical problems but cannot organize their knowledge to the point of developing a solution.

These are but two aspects of a situation which the professor is assaulting with some old fashioned tools of basic grammar, but with a new twist.

"My approach is to view communication as an analytical prob-

lem of the type which engineers face every day," Professor Wilcox said. "You have a problem; you design a package that will take care of it; you check it out; you make a trial run or a mockup; you finish it; you deliver it; and it does the job."

"When an engineer can approach communications by using well recognized principles of operation, he doesn't mind it at all. He likes it. This is how he becomes an effective writer or speaker."

While not disagreeing with the current popular theories of communications, he feels that many of them are not practical for proposal writing, technical reports and other types of communication found in industry.

"You cannot count syllables with an engineer, but you can help him squeeze out all that is not necessary. Still, he must be

precise which may lead to longer sentences. Our goal here is not brevity, as one modern school of thought would have it, but communication. When an engineer says precisely what he means there should be no problem about whether his sentences are too long or too short."

The men attending the course go one day a week at 4 p.m. in a conference room on the second floor of the NSL building. The two-hour classes held Monday through Friday, June 6 to August 26 are limited to 15 people.

During the 12 weeks the men analyze many facets of technical communication from simple sentences to technical papers. Most lectures are accompanied by writing assignments and critiques.

Perhaps one of the most unexpected assignments of the course is to read a novel. (The

last chapter of the textbook contains a five-year reading program covering a broad spectrum of fiction and nonfiction works. The text, Technical Communications by Professor Wilcox, was published by International Textbook Company.)

"Many executives of firms employing engineers and scientists have said to me they would prefer to hire people who are well read in imaginative literature," Professor Wilcox said.

"It is felt that this type of person would be the one most likely to continue working on a technical problem long after scientific or mathematical techniques are exhausted, simply because he is not afraid to use his imagination."

The course has two major effects, one on the individual and one on the company for which

he works, Professor Wilcox believes.

"The individual should come away with a calm assurance that he can cope with situations requiring communications. He may not know all the answers but he won't be afraid. He will be more inclined to express himself."

"The principal benefit to the company is that its people see more ways they can serve their employers and they are more likely to come forth with new ideas that are better organized, more precise, concise and meaningful."

Professor Wilcox served 16 years in industry before joining the ASU engineering faculty in 1955. Since then he has been an advisor and consultant for various professional groups including the California Teachers of English, the Arizona CPA's, STWP, and IEEE.

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

For Sale

Sofa, contemp. decorator design, sauterne color, 101" width, 2 seat cushions, 4 back cushions, custom made at \$867 cost, \$450. Bel Air, 472-2571. A

Porsche coupe, 1963, r/h, vinyl int., \$3000. Santa Monica, 395-7368. A

Chevrolet, 1955, 2-dr. sedan, r/h, auto. trans., \$300. Inglewood, 758-9182. A

Ski Rack, adjust. for convt. tops, holds 6 pairs, \$6. Torrance, 323-8089. A

Radio Equipment, amateur-type, Clegg Thor 6 transceiver, complete w/power supply modulator, RF receiver sections & 10' interconnecting cable, \$250. Fullerton, 714-529-5961. A

Chevrolet, 1957, new eng., paint, int., brakes, tires, \$850. Torrance, 378-2026. A

Sailboat, 11' fiberglass Lark, alum. mast & boom, dacron sails, rigged w/nylon rope, avail. w/slip, \$395. Marina del Rey, 823-2655. A

Washer, wringer-type, \$20. Hollydale, ME 3-2395. A

Home, 4-bdrm., 1½ baths, bltins., service porch f/place, 5¼% G.I. financing, \$35,500. P.V., 378-0120. A

Chevrolet, 1955, deluxe, r/h, auto. trans., \$150. Gardena, OS 5-2159. A

Home, 3-bdrm., corner lot approx. 57 x 150, fireplace, bltin. island stove w/eating bar, 1¼ bath, fenced, heated pool, 4 yrs. old, near schools, \$38,700. Manhattan Bch., FR 2-0901. A

Chevrolet Impala, 1959, p/b, p/s, w/w, new tires, \$500. Inglewood, 676-3132. A

Boat, 15' Wizzard, all fiberglass, trailer, 35 h.p. Evinrude o/board motor, \$500. Gardena, DA 4-7623. A

Sailboat, 19', w/motor, 1964, 2 bunks, fiberglass, trailer, many extras, \$2500. Lawndale, 679-8490. A

Dining Room Set, Danish walnut contemporary, boat-shaped table 57"x36", 4 uph. chairs, include 2 12" leaves & pads, cost \$400, \$100. Sepulveda, 894-8490. A

House, east Long Bch. area, 4-bdrm., 3-bath, 2-story, h/wood flrs., elec. bltins., patio, landscaped, block walls, take over existing 5¼% loan, \$32,000. Cypress, 714-828-9142. A

Pickup, Datsun, 6-ply w/w tires, hvy. duty bumper w/hitch, 4-spd. gear box, heater-defroster, other extras, \$1225. Lakewood, 425-1030. A

Coins, 300 U.S. & foreign, \$100. Box 1501. Taunus, German Ford, 1961 4-dr. deluxe sedan, r/h, s/belts, 4-spd. trans., \$250. San Pedro, 831-9600. A

Mustang, 1965, 2+2 fastback, auto. trans., \$2095. Torrance, 370-2048. A

Honda, 1965, 250 cc, Scrambler, \$600. Inglewood, 676-8982. A

House, 2-bdrm., full dining room, fireplace, dble. garage, \$20,950. Inglewood, OR 1-3860, FR 5-5097. A

Cadillac, 1959, coupe DeVille, r/h, air cond., elec. windows, trunk, door locks, \$1000. Lawndale, 370-6472. A

House, 3-bdrm. & den, 10 min. to Norair, near schools & fwy., panel & draped liv. rm., ample yard, \$21,900. Gardena, DA 5-2904. A

Honda, 1965, 305 Super Hawk, scrambler, bars, 2 helmets, extras, \$550. L.A., 277-2549. A

Aquarium, 26 & 10-gal., complete w/fish, pump, filters, heaters, reflectors & stand, \$65. L.A., WE 3-3051. A

Camper for ½-ton pickup, \$100. Hawthorne, 644-1205. A

Boat Loader, cartop-type, \$25. Inglewood, OS 6-2162. A

House, 5-bdrm., extra lge. living rm. & den, 2½ bath, patio, many trees, 2700 sq. ft., bltins, P.V. stone & brick fireplaces, \$39,950. La Habra, 691-5166. A

Camper, \$250. Santa Ana, 714-547-2707. A

Thunderbird, 1963, factory air-cond., all power equipped, orig. owner, 33,000 miles, \$1950. Thousand Oaks, 805-495-0507. A

Antique Jewelry, family collection, \$3-\$15 ea. piece or whole group of 18 pieces, \$100. P.V. Pen., FR 8-1863. A

Bedroom Set, child's, twin-size, chest, mirror, chair, book case, toy chest, \$95. Hawthorne, OS 5-7965. A

Sprite, 1962, roll bar, 1965, 1100 cc eng., competition head, 1½" s.u. carb., Goodyear blue streaks, comp. exhaust, plus many extras, \$750. Port. Bend, 377-2921. A

Ford, 1955, 2-dr. sedan, auto. trans., \$140. Hawthorne, 676-6423. A

Movie Camera, Bell & Howell, 8mm, manual zoom, auto. threading projector, \$100. Hawthorne, 675-2813. A

Engine for 1962 Sprite, complete, \$200. Box 1502. A

Range, O'Keefe & Merritt, gas, w/griddle, grillvator, \$65. Hawthorne, 679-2983. A

House, near Northrop, 2-bdrm. & paneled den w/fireplace, alum. siding, detached 2-car gar. 10% dn., \$23,500. Inglewood, 676-2958. A

House Trailer, 38'x8' Stewart Coach, eastern blt., fully furn., new awning, \$995. Hermosa Bch., 374-3738. A

Ski Boat, 16' Guasti, new velvet drive, Chev. 301 inboard, all fiberglass, \$2950. Torrance, 328-7997. A

For Sale

Ford, 1957, Country sedan station wagon, p/s, p/b, w/w, auto. trans., recently o/hailed, factory luggage rack, r/h, \$195. Rolling Hills Estd., 377-3810. A

Shotgun, Win. 12, trap, 32" full choke, vent rib, pad r/o stock, epoxy finish, \$225. Hawthorne, 676-4251. A

House, 2-bdrm., 3 acres fenced for horses, 1½ bath, electronic oven, lge. serv. porch & pantry, det. gar., enc. brick patio, fruit trees, near Lancaster, \$19,950. Van Nuys, 805-943-4200. A

Guitar Amplifier, 8" speaker, 33-watt output, dual jack input, 110 V ac, \$25. Torrance, 371-9925. A

Cadillac, 1962, Eldorado convt., full power, factory air, leather int., \$2150. San Pedro, TE 3-9455. A

TV, 21" General Elec. console, new picture tube, rebilt. tuner, antique white finish, \$45. Santa Monica, EX 4-8641. A

Triumph, 1964, TR4, 2-dr. convt., low mileage, \$1900. Thousand Oaks, 805-495-9984. A

Chevrolet, 1959, Bel Air, 2-dr., \$395. Inglewood, 674-1847. A

House, Hollypark, 5 min. to Northrop, 3-bdrm. & den, sprinklers front & rear, gar., disp., dishwasher, range & oven, \$25,500. Gardena, DA 9-5657. A

House, 3-bdrm., 7 yrs. old, 6' block wall, dble. gar., \$2000 dn. to existing 5¼% loan, consider second, \$19,000. Lakewood, 865-8009. A

Lots, 2 adjacent, in Greenlawn section, Inglewood Park Cemetery, \$400 ea. or both \$700. Hawthorne, OS 6-8842. A

Darkroom Equipment, complete outfit, enlarger, auto. timer, safe lites, mounted on sturdy compact table, all access., \$65. Hawthorne, 676-2803. A

Car Cooler, Northaire, 12-volt, 2-spd., \$15. Inglewood, OR 1-1490. A

Volkswagen, 1959, station wagon bus, \$495. L.A., 384-2918. A

Cabin Site, Lake Arrowhead area, trees, road, water, electricity, ready for building, \$1500. L.A., 472-3374. A

House, 4-bdrm., 2½ baths, large fenced-in backyard, immediate occupancy, \$56,900. P.V. Estd., 377-6100. A

Piano, grand, chickering, \$750. Redondo Bch., FR 9-1804. A

Motorcycle, 1964, BSA 350 cc, o/hailed, new wiring, take over \$28 mo. pymts., \$600. Lynwood, NE 9-3608. A

Falcon, 1965, auto. trans., metallic blue, \$1350. Burbank, 848-7790. A

Volkswagen, 1963, r/h, many extras, \$1195. Torrance, DA 9-4356. A

Movie Camera, 8mm Kodak, incl. projector & light meter, \$30. Newbury Pk., 805-498-3872. A

Dishwasher, GE deluxe, portable, w/cherrywood top, bronze, \$100. Manhattan Bch., 374-0940. A

Electronic Equipment, 2" oscilloscope, sweep freq. oscillator, marker generator, Simpson mod. genoscope, orig. cost \$550, \$175. Buena Pk., UN 3-2769. A

Tape Recorder, Viking stereo 88, walnut case, \$195. Torrance, FA 8-8056. A

Bedroom Set, dble. bed w/spring & mattress, 5-dwr. dresser, vanity w/bench, \$40. L.A., AX 2-3445. A

Kug, 12x15 dk. brown, braided, \$25. Manhattan Bch., FR 6-9964. A

Trailer Hitch, Super Tour-Aid, level-adjust, hvy. duty, cost \$110, \$50. Chino, 714-528-7604. A

Coffee Table, w/matching end tables, white w/brass legs, \$65. Torrance, 371-5916. A

Autoette, elec. car, used 1 month, \$600. Torrance, DA 5-7154. A

Dining Room Set, 6-pc., birch, opens to 108" & pads, \$125. L.A., AX 2-1793. A

Volkswagen, 1955, sedan, new brakes, engine o/hailed, \$450. Torrance, DA 3-8797. A

House, 2-bdrm., gar., large fenced lot, \$18,500. Redondo Bch., 376-2117. A

Cribs, w/mattress, \$10; w/out mattress, \$5. L.A., PL 7-3595. A

Dishwasher, portable Kitchen Aid, never used, still crated, \$100. Manhattan Bch., 788-7519. A

Cornet, \$65. Torrance, DA 9-9670. A

Volkswagen, 1963, sunroof, \$995. Torrance, 375-2018. A

Stove, 3-burner camp-type, Sears, \$10. Box 1503. A

Ford, 1960, chrome wheels, hydraulic lift, \$900. Torrance, 324-8789. A

Chrysler, 1956, 4-dr., \$75. Hawthorne, 671-0087. A

Bed, child's, & play pen, \$20 or sell sep. Lynwood, 632-2642. A

Screen, Aurora Super deluxe tripod-type, 50" x50", model S, \$20. San Pedro, FR 2-6585. A

Amateur Equipment, Morrow MB560A transmitter plus 12 dc supply 80 thru 10 meters, \$40. Panorama City, 894-3244. A

Piano, Fairbanks, upright, mahogany, new ivory, felt hammer pads & pedals, full keyboard, bench incl., \$125. Box 1504. A

Guitar, Fender elec. Jaguar, w/case, custom white, \$450 value, \$325. Costa Mesa, 549-1760. A

For Sale

Wig, 100% human European hair, black short-do, wig stand & case, cost \$175, \$55. Hawthorne, 644-2130. A

Refrigerator, \$75. Buena Park, TA 7-1352. A

Racing Bike, 10-spd., \$30. Rolling Hills Estd., FR 5-8536. A

House, 3-bdrm., bltins, bltin TV/Hi-Fi area, raised fireplace, 500 sq. ft. playrm-workshop, 2½ car gar., fruit trees, walking dist. to shops, 20% dn., \$26,000. Alhambra, AT 4-5698. A

House, 4-bdrm., family rm., 2½ baths, 1 acre, horses OK, near Northrop Ventura, \$35,000. Somis, 805-482-1186. A

Accordion, 120-bass, Universal, 2 treble & bass reed sets, Mother-of-Pearl, w/locking velvet-lined case, \$150. Torrance, 371-9651. A

Air Conditioner, powerful, \$125. Hollywood Hills, HO 3-6327. A

Golf Clubs, left-handed, #2 thru #9 irons, 3 woods, \$35. Torrance, 324-9193. A

Rug, 9x12, pale lavender nylon cut pile, \$40. P.V. Pen., 377-7670. A

Supercharger, McCulloch, never used, \$50. Inglewood, PL 5-4497. A

Pup, Collie, male, tri-color, 15 mos. old, reg., w/dog house, \$150. Lawndale, 679-0710. A

Vacuum Cleaner, Hoover, upright deluxe, all attachments, \$17. Torrance, 770-1197. A

Range, Philco, elec., \$15. Torrance, FR 8-0500. A

Home, 3-bdrm., Torr. area of Rolling Hills, fireplace, serv. porch, block wall fence, patio, rm. for pool, \$25,500. Torrance, DA 6-2798. A

Transmission, 4-spd., Ford, for 1960, '61 or '62 model, w/bellhousing, clutch, flywheel & throwout bearing, \$200. El Segundo, 322-3420. A

HO Train, 1 old-fashioned-type, 1 freight, 1 pass., 6 elec. switches, 4x8 board w/buildings, \$45. Hawthorne, OS 6-9989. A

Car Cooler, Bon-Aire, 12 volts, \$20. Lawndale, 370-3821. A

Record Player, Steelman portable, w/record stand, \$25. Hawthorne, 676-3142. A

Speed Boat, 14', merline hull w/Mercury Mark-55 motor, complete w/trailer, windshield, \$595. Lakewood, HA 5-0581. A

Ford, 1965, Galaxie 500, r/h, p/s, fact. air, 17,000 miles, \$2295. Long Bch., GA 3-1363. A

Refrigerator, Philco, good for apt. or cabin, \$35. Gardena, DA 4-2972. A

Mountain Cabin, Idyllwild, 3-bdrm., den, sewing rm., 1¼ bath, elec. kitchen, fireplace, gas heat, 100x150 lot, \$17,200 loan, low dn., \$20,300. Anaheim, 714-535-6712. A

Volkswagen, 1965, sedan, 12,000 miles, white int., w/s/w, \$1495. Inglewood, 673-1589. A

Front Fender, left, for 1955 Chevrolet Bel Air, \$15. Long Bch., GA 7-4197. A

Birds, finches & imported, 27 varieties, males, all for \$100. Hawthorne, OS 6-5250. A

House, 3-bdrm., 1 bath, dble. gar., fenced yard, near schools, \$26,750. Redondo Bch., FR 5-2756. A

Sunbeam Alpine, 1955 rdstr., rebilt. eng., trans., rearend, new tires, good top, \$290. Inglewood, 672-6188. A

Airplane, 1948 Swift, 180 h.p. Lycoming eng., 171 hrs., 51 hrs. since new chrome cyls. & 4 ring pistons, full I.F.R. panel, rotating beacon, aux. tank & Mark XIII V.O.A. IV marker beacon, \$7100; w/out radio, \$6000. Palmdale, 805-947-4005. A

Sailboat, 22' Star Class, 2 sets dacron sails, trailer, \$1850. Inglewood, 674-1951. A

Boat, 14' all glass, 35 h.p. elec. start Evinrude, trailer, 2 6-gal. gas tanks, cover, \$525. OS 5-3254. A

Tool Chest, 9-dwr. rollaway-type & mechanic tools, Craftsman, \$250. Redondo Bch., 372-4857. A

Cadillac, 1960 Fleetwood, air cond., all extras, leather, \$1100. L.A., 645-5447. A

Ford, 1946, station wagon w/Olds eng., new paint, \$100. Inglewood, OR 1-7803. A

Acres, 4 40-acre parcels, near Lake Isabella, mountain timber, \$220 to \$420 acre. Redondo Bch., FR 4-2945, 249-0185. A

Dog, German shepherd, AKC, all black female, 5 yrs. old, \$150. Lawndale, 675-6283. A

Home, Medallion, 4-bdrm., 1¼ bath, unusual kitchen, fireplace, dishwasher, screened-in alum. patio, \$26,000. Torrance, 834-2175. A

For Sale

Ford, 1955, Galaxie 500 convt., low mileage, \$2200. L.A., PL 6-2587. A

Wanted to Buy

Boat, alum., 12' or 14' & 9 to 15 h.p. motor. Redondo Bch., FR 2-5310. B

Camper Shell, for ½-ton Chev. Fleetside pickup, 8' bed, full door across back, will pay \$100. Torrance, 325-8212. B

Writing Course, must be complete. Hawthorne, OS 6-8331. B

Deep Freeze, small. Rolling Hills, FR 7-3487. B

Secretary, any finish, glass doors on top, good condition, pay cash or trade maple tables. Long Bch., 433-0861. B

Outboard Motor, 7 to 10 horsepower. La Habra, OW 7-2445. B

For Trade

Mercedes-Benz, 1958, 220S, leather, Becker, belts, 1 owner, trade for 190 SL roadster. Rolling Hills Estd., 375-7038. C

FREE (To Be Given Away)

Engine & Transmission, Packard 1954 straight 8 Ultramatic, can be rebilt. or used as strawberry planter. Inglewood, OS 6-3095. D

Box Trailer, 2-wheel. Hawthorne, 676-3138. D

Rentals Offered

House, 3-bdrm., 1½ baths, bltins, fenced, forced air heat, lease w/option, or \$175 mo. Inglewood, 323-7244, 677-7660. E

Apt, deluxe, 3-bdrm., 1¼ baths, fireplace, bltins, dishwasher, many extras, \$235 mo. Inglewood, 671-3798. E

Studio Apt, 2 & 3-bdrm., 1½ bath, bltin stoves & ovens, pvt. patios, gar., \$125 & up. Inglewood, OR 1-8161, DA 5-4021. E

Cabin, A-frame, at Big Bear Lake, Moonridge area, sleeps 6 adults or 4 adults w/children, 1 block from golf course, swimming pool & riding stables, \$30 w/end; \$80 wk. P.V. Estd., FR 7-3888. E

Apt, 1-bdrm., unfurn., carport, bltins, water & trash paid, \$90. Hawthorne, OS 5-5898. E

Apt, 1-bdrm., modern, furn., walking dist. to Northrop, no children, no pets, \$87.50. Hawthorne, OS 6-4734. E

Apt, 1-bdrm., redecorated, near Northrop, water & trash paid, furn., \$90; unfurn., \$75. Lawndale, OS 5-9695. E

Studio Apt, 2-bdrm., 2½ bath, w/all luxury features, subterranean parking, in Inglewood, \$180 on 12 mos. lease. L.A., 670-6084. E

Apt, 1-bdrm., unfurn., redecorated, disp., tile kitchen & bath, baby OK, \$80. Hawthorne, OS 5-8335. E

Apt, 2-bdrm., 2-bath, deluxe, near Northrop, small child OK, \$150. Hawthorne, OS 5-2772. E

Apt, 2-bdrm., 2-bath, unfurn., new, dish-washer, pvt. balcony, sub. parking, play yard, \$155 mo. Inglewood, FR 5-0867. E

Apt, 2-bdrm., unfurn., near Lynwood High School, \$99.50. Lynwood, NE 5-3250. E

Vacation Cottages, Idyllwild, secluded, creek, patio, \$20-\$35 w/ends; \$50-\$65 wk. L.A., PL 4-5288. E

House, 1-bdrm., unfurn., near Hawthorne High School, \$60 mo. Hawthorne, 323-9586. E

Vacation Cabins, Lake Gregory & Crestline, make reservations thru Sept., \$25 w/ends, \$60 wk. Venice, EX 1-2040. E

Child Care Offered

Child Care in licensed home, fenced yd., hot lunches, reasonable. Lawndale, 679-5827. G

Personals

Many thanks for the cards, flowers & interest shown in my progress. I want you to know it is appreciated & I am looking forward to the time when I will be able to resume my association with you. PAUL H. CREWS. L

We gratefully acknowledge the many kind expressions of sympathy in our time of sorrow. THE MARVIN EDWARDS FAMILY. L

To all my friends at Northrop, thank you so much for your lovely flowers & cards & also the monetary contributions made to my family upon the death of my father. Your kindness & thoughtfulness were deeply appreciated. BETTY RUMPHORST & FAMILY. L

For Sale or Trade

Lots, 2, hunter's cabin, Big Bear, \$4000 or trade for trailer or boat. Manhattan Bch., FR 2-3878. M

Going my way?

Rides Wanted

7 a.m. — 3:45 p.m.

Euclid & Katella, Anaheim. Charles Day, Norair, ext. 1146, 772-9313. 2

7:30 a.m. — 4:12 p.m.

Prairie & Imperial, Inglewood. Bonnie Webb, Norair, ext. 2611, OR 7-0515. 3

Paramount & Del Amo, Lakewood. Ruby Franks, Norair, ext. 1065, 422-3368. 3

8 a.m. — 4:42 p.m.

Doty & 104th St., Inglewood. Virginia Koehn, Norair, ext. 1110, 671-5242. 5

Devonshire & Sepulveda, Granada Hills. R. J. Rothstein, Norair, ext. 1188, 360-1377. 5

Erbes Rd. & Thousand Oaks Blvd., Thousand Oaks. Hugh M. Cameron, Norair, ext. 2845, 805-495-9984. 5

Topanga Cyn. & Ventura Blvd., Canoga Park. Richard Erickson, Norair, ext. 2314, 347-4288. 5

Victory Blvd. & San Diego Fwy., Van Nuys. Patti Schow, NSL, ext. 2766, 2757, 780-7444. 5

Topanga Canyon & Vanowen, Canoga Park. Stanley J. Ehlinger, Nortronics Haw., ext. 75-461 & 462, DI 8-3289. 5

Melrose & Hoover, Silver Lake & Hollywood Fwy., Los Angeles. J. F. Low, Norair, ext. 1676, 664-6564. 5

Platt Ave. & Victory Blvd., Woodland Hills. William J. Palmer, Norair, ext. 1074, 347-5940. 5

Rides Offered

7 a.m. — 3:45 p.m.

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Platt Ave. & Victory Blvd., Woodland Hills. William J. Palmer, Norair, ext. 1074, 347-5940. 15

BOARDS

(Continued from page 2)

the two will benefit each other for greater combined growth. The Hallicrafters Company has divested itself of certain loss operations. The assets being acquired are expected to produce reasonable earnings," Mr. Jones said.

Northrop plans to form a new subsidiary which will acquire substantially all the assets and assume substantially all the liabilities of Hallicrafters.

The Northrop \$1 par value cumulative preferred stock to be issued will be convertible into Northrop common stock beginning three years after issuance. The conversion price will be 117-1/2 percent of the average closing price of Northrop common stock on the New York Stock Exchange for the 10 trading days immediately preceding the closing, but not less than \$34 and not more than \$45 per share. The preferred stock will be redeemable at \$35 a share any time after five years from issuance and will be entitled to receive \$35 per share in liquidation.

AD ASTRA PER ASPERA

(Continued from page 4)

for review.

"The acceptance of four papers at the IEEE convention helps to establish the Nortronics Applied Research department as one of the leading laboratories on radiation effects," George Messenger, chief of the Nuclear Effects group, said.

Titles and authors of the NARD papers were:

Effects of Oxygen and Dopant on Lifetime in Neutron-Irradiated Silicon; Dr. Orle Curtis, chief of the Basic Mechanisms group.

Nuclear Radiation Effects; Mr. Messenger.

Effect of Injection Level on Carrier Lifetime in Neutron-Irradiated Germanium; Dr. Curtis and Carl Germano, associate scientist.

Detailed Lumped Model Analysis of Transistor Ionizing Radiation Effects; J. P. Raymond, scientist; and R. E. Johnson, associate scientist.

In addition, Dr. Curtis and Mr. Raymond were on the conference Papers Committee; Dr. Curtis was on the roundtable on Fundamental Damage Mechanisms; and Mr. Messenger was chairman of the Awards Committee and chairman of the first session, which was devoted to Displacement Effects in Silicon.

Apollo ELS A Hit With Youngsters

The inquisitive nature of young children was demonstrated recently when 800 students at Desert Garden School in El Centro were shown "The Last Five Miles Home," a movie produced by Northrop Ventura.

The movie traces the Apollo Earth Landing System from fabrication at Ventura to drop test. It was loaned to the school by James E. Middleton, supervisor of the Facilities Support unit at Ventura's El Centro facility.

"I'm very interested in our space program, and the film answered a lot of my questions," a 9-year-old boy wrote, thanking Mr. Middleton for showing the film.

"I usually get tired of watching space movies, but this one was good," an 8-year-old girl wrote.

Other comments, clearly showing an enthusiastic interest in the nation's space program, included:

"I learned very much from the movie. I liked when the film told about the reef cutter. I didn't even know there was such a thing before."

"The part I liked best was when we saw the people making the parachutes."

"It was very exciting, and I liked when they were testing the parachutes."

"Our class liked 'The Last Five Miles Home' very much. I liked it because the recovery system was very interesting."

Among the children seeing the movie was Mr. Middleton's son, Jim, who also wrote a thank-you note.

The children were between 8 and 11 years old.

LUNAR DRILL

(Continued from page 1)

tion of Phase "C" findings, would include manufacture. One other firm, the Martin Company, also has a Phase "C" contract and is competing with Northrop.

The tool is called the Apollo Lunar Surface Drill. A much larger lunar drill, capable of cutting as much as 100 feet into the subsurface of the moon, is being designed by NSL at Huntsville, Alabama under a contract with another NASA center.

The preliminary design phase on that project is nearing its end, project officials said.

SLOWED BY STORMS

Minghelli Sets Sailplane Records

Northrop's Ed Minghelli has flown a sailplane he fabricated in his spare time to what appears to be new national and state records for distance flown by two-place sailplanes.

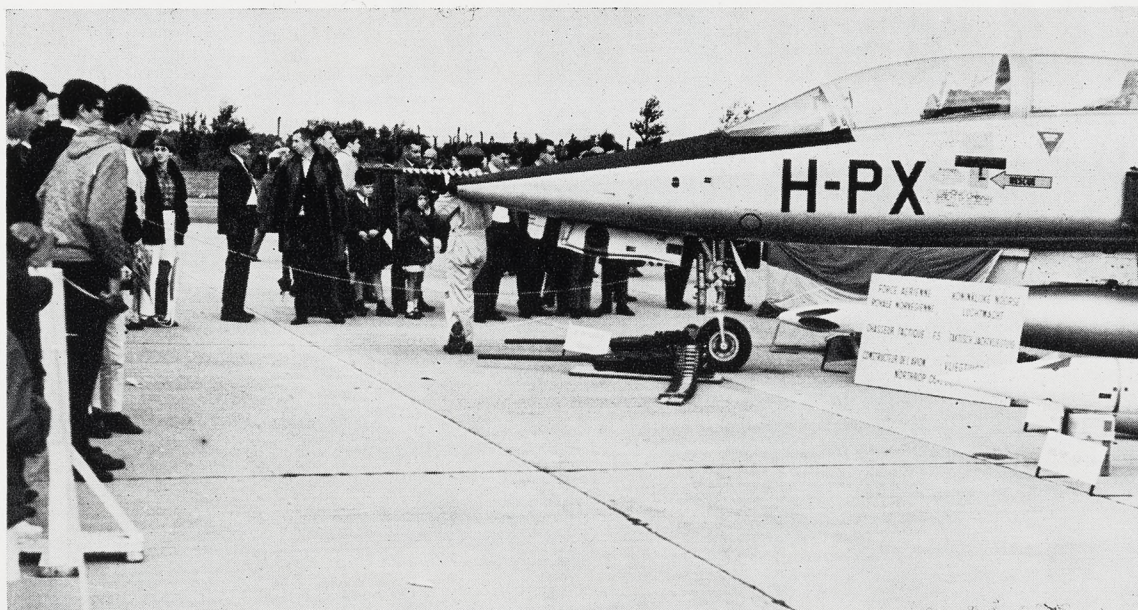
Both marks toppled July 9 when he soared from El Mirage, California, to the vicinity of Elko, Nevada, a distance of 403 miles.

The present national distance record is 309 miles. The state record, set by Mr. Minghelli in the same sailplane last summer, is 278 miles.

Certification of both records is in progress by the Soaring Society of America.

While elated over his twin triumphs, Mr. Minghelli was disappointed in not covering another 100 miles or so. That would have

ASSIGNMENT IN BELGIUM



Norwegian F-5 tactical fighter, surrounded by its armaments, attracts gallery while on display at Belgian Air Force meeting at Beauvechain, Belgium. Five Royal Norwegian Air Force F-5's participated. Benelux press esti-

mated crowd at between 100,000 and 150,000. Captain Per Ekholdt, who commanded flight of F-5 squadron from Edwards AFB to Norway earlier this year, performed flying demonstration.

Bats Come Alive As Softball Nine Moves Into Second

After a slow start, the bats at Northrop Ventura are busy again.

The Ventura softball team, second in its league last summer, lost two of its first three games in conference play this year.

But three weeks later, after three consecutive wins, the Venturans were in a three-way tie for second place as this week began.

They moved into the second-place tie last week, defeating the winless Thousand Oaks Fraternal Order of Eagles, 12-1. Manager Chuck Taylor, catcher Dale Thomson and third baseman Ron Lancaster hit home runs.

Andy Andrews won his third game of the year, making his pitching record 3-2.

Tied with the Venturans were the Thousand Oaks News-Chronicle and Neilson's Plastics. All three teams were 4-2.

Von's Market led the league with a 5-1 record.

Win or lose, the tie was broken Tuesday night, as Ventura met Neilson's, and Von's played the News-Chronicle.

All games are played at Thousand Oaks High School.

Credit Union Gives 5 Percent Dividend

The board of directors of the Northrop Ventura Credit Union has declared a 5 percent dividend to shareholders for the first six months of 1966.

NORVIPS: She Talks to Pilots, Surmariners and Artillerymen

(Continued from page 1)

tronics, provided autographed pictures for the curious pilots.

For nearly two years, Mrs. Ririe was a vocalist with Russ Morgan's orchestra, using her professional name, Joan Elms.

She was under contract to MGM for seven years, and has been singing since she was 3 years old.

Today, she and her husband, a professional drummer, have two children—a 3-year-old daughter and a 1-year-old son.

When she isn't involved in the usual duties of mother and housewife, and isn't recording for NORVIPS, she's teaching in night school.

Mrs. Ririe teaches English, speech and citizenship in adult school at Washington High School in Los Angeles.

Before her marriage, four years ago, she lived in Sydney, Australia, for six years, where she owned a wrought iron furniture store.

The engineer who records her voice for NORVIPS, Northrop's Bill Stroub, became her accompanist one night in an impromptu "jam session."

"We were recording NORVIPS messages one night," Mrs. Ririe said, "and Bill had a guitar there. So we took a break when we finished the NORVIPS tapes and recorded a tape of music."

"Bill played the guitar, and I sang. He really plays well."

Mrs. Ririe doesn't get much of a chance to study her "script" for

NORVIPS.

"I just go there," she said, "and I'm given a sheet of paper with the messages on it. I read them over a few times and record them. One day I had to do about 90 of them. I was really exhausted when I finished."

She admits her NORVIPS recording work is "just a little bit different from most jobs."

"I keep threatening to get a new script writer every time I get something about high bilge or fire in the crew's quarters," she said, "but nobody listens to me."

PPD WILL BUILD MARK 46 TORPEDO PRECISION PARTS

Northrop Nortronics' Precision Products department at Norwood, Massachusetts, has received two contracts totaling more than \$1 million to build precision guidance instruments for the Navy's new Mark 46 deep-running torpedoes.

The largest award, made by Aerojet General Corporation, Mark 46 prime contractor, is for production for 528 miniature gyroscope and accelerometer packages which control the underwater weapon's roll, pitch and yaw attitudes. The other contract, from the Naval Ordnance Plant at Forest Park, Illinois, is for 90 identical packages to be used on experimental torpedoes.

Cadets Give Up Holidays For Studies

Six Air Force Academy cadets have given up their summer vacation — at their request — to study research techniques under guidance of Northrop Corporation industrial scientists in the Conejo Valley.

The cadets are participating in the Academy's Summer Research Program, which was begun in industry last year by Dr. Donald A. Hicks, vice president and manager of the Nortronics Applied Research department (NARD).

They began work at NARD late last month and will end their four-week stay there on August 12. Two of the six are 1966 graduates of the Academy, and have been commissioned as second lieutenants. The others are first classmen (seniors). All are science majors.

When the cadets arrived, Dr. Hicks was presented a framed photograph of the Academy's Chapel, in recognition of Northrop's work in support of Academy programs.

The award was presented by Captain John D. Johnston, an Academy mathematics professor, on behalf of Lt. General Thomas S. Moorman, superintendent of the Air Force Academy.

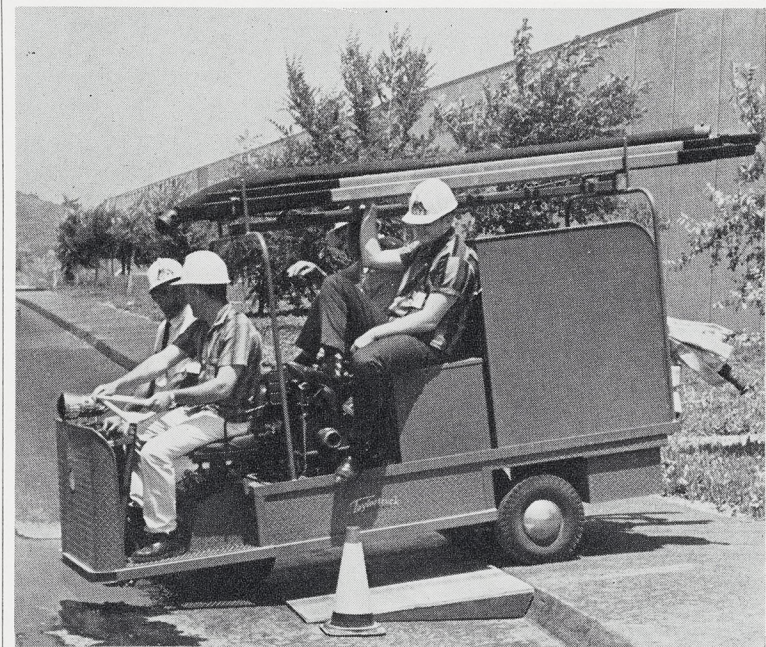
"I should like to thank you," General Moorman wrote in an accompanying letter, "for the excellent support you have given the U.S. Air Force Academy. In particular, I am most grateful for the excellent speakers you have furnished for the Cadet Mathematics Club this past academic year."

Cadets participating in this year's program are John P. Cerak, Charles A. Denham, Donald L. Ermak and James P. Hogarty. The newly graduated cadets are Lieutenants John R. Wormington and William B. Rankin.

For their four weeks at Northrop, the Air Force men have been paired off with research scientists studying the various disciplines affecting the environment of nuclear weapons effects.

"We had never received support from industry before the Northrop program last year," Captain Johnston told Dr. Hicks.

Costs incurred in the summer research program in industry are not charged to the government.



VALUABLE TRAINING—J. B. Smith drives the Northrop Ventura Fire Brigade hose truck in one of the group's monthly training sessions. With him are (front seat) Dale Gilmore, Brigade captain; (back seat) Chuck Kennedy and Frank Balaszi (partially obscured). In front of Mr. Kennedy on the floor of the truck is the Fire Brigade's new pumping unit.

NORTHROP NEWS

NORTHROP VENTURA

Published biweekly by Northrop Corporation, Beverly Hills, California

Vol. 24, No. 15

August 17, 1966

Contractors For Boeing SST Named

Northrop Norair and five other aerospace firms have been named by The Boeing Company to do major subcontract work on the SST prototypes Boeing is competing to build.

Norair will manufacture body structures for the jet airliner prototypes. Negotiations are under way, and the exact dollar value of Norair's part of the program has not yet been determined.

Under Boeing's "total-program" plan, Norair and the other subcontractors working on the SST will be assured the opportunity of a continuing part in production on the supersonic airplane.

Subcontract work by the six companies will total more than \$1.5 billion, based on the Federal Aviation Agency proposal of an initial production of 200 Boeing supersonic transports.

Manufacturing will entail milling, forming and fabrication of titanium alloy, Boeing said.

Boeing is one of two airframe manufacturers taking part in U.S. supersonic transport competition being conducted by the FAA. Proposals will be submitted September 6, with the contract winner scheduled to be selected by the end of the year.

Selection of subcontractors to help build the Boeing SST was made on the basis of an evaluation of interested firms which have the capability, capacity and established product development technology, Boeing officials said.

Boeing officials said major areas of consideration in the selection were the judged capabilities of potential subcontractors to support the program both during the crucial prototype development phase and at planned production rates.

The other companies selected are Republic Aviation Division of Fairchild Hiller, Farmingdale, New York, body structure; LTV Vought Aeronautics Division of LTV Aerospace Corporation, Dallas, body structure.

The Martin Company, Baltimore (See SST, page 6)



LUXURIOUS INTERIOR—Three rows of seats is one of the more obvious differences in Boeing 747 jet passenger aircraft presently in design phase at Renton, Washington. The 747 will carry 350 to 490 passengers and cruise at

more than 600 miles per hour. Northrop Norair will build the passenger section of the fuselage, and Northrop Ventura will build wing fairings for the huge jet.

Photo courtesy The Boeing Company

20-YEAR-MAN BARTELS HEADS SERVICE LIST

Charles Bartels, who joined Northrop Ventura in 1946 as a design layout engineer, became eligible for his 20-year service pin this month.

Mr. Bartels, now an administrator on the Apollo Project, advanced from design layout engineer to group engineer, section engineer, engineering specialist, staff administrator, administrator and project administrator.

He and his wife, Cleo, live in Woodland Hills. He is a charter member and past president of the Woodland Hills Country Club.

Five persons became eligible for 15-year pins this month. They are:

William Cope, Arlene Douglas, Alta Hegeman, Taswell Payne and Ann Pinkerton.

Ten-year pin recipients this month are Betty Botwright, Joseph Ferro, Dorothy Graham, Iva Hardin, Virginia Noble, Ted Szostek and Cecil Townson.

Army Contract to Improve Mothballed Drones Awarded

Northrop Ventura has received a substantial contract from the U.S. Army for the repair and modification of 865 MQM-33A and MQM-33B target drones.

Under the agreement, Ventura will install new pistons and cylinders on each of the drones, increasing horsepower from 72 to 96, and raising the maximum speed from 175 to 200 knots.

The MQM-33 series drones were built by Ventura from 1951 until 1961, but the ones being rebuilt are from 1957 through 1961 vintage. Project manager is L. H. (Hank) Campbell.

The MQM-33B drones—625 in all—basically will receive only the engine modifications, plus a thorough inspection and replacement of any worn or otherwise substandard components.

The 240 MQM-33A drones will receive the engine modifications, as well as an infra-red wiring as-

sembly, 12 smoke canisters and a kit enabling the MQM-33A to be launched from the Northrop Ventura-built ZL launcher.

The MQM-33A will be used for Army Redeye missile training. The Redeye is a heat source-seeking missile, and the infra-red assembly will provide the missile with a "hot" target.

Heat-generating capsules, connected to the infra-red wiring, will be installed on each wing tip and beneath the fuselage. Each heat capsule, activated from the ground, will burn for approximately 90 seconds, Mr. Campbell said.

The smoke canisters are activated, also from the ground, to make the target easier to see.

The drones were in storage at the Pueblo Army Depot near Pueblo, Colorado. An initial quantity has been shipped to Ventura, and the others will arrive on a monthly basis.

As they arrive, Mr. Campbell said, they'll be placed on a horse-shoe-shaped assembly line. On one side of the line, they'll be uncrated, disassembled and cleaned. Returning on the other side of the line, they'll receive necessary modifications, be thoroughly tested with the engine running, and re-crated.

Five drones will be rebuilt each day.

Additional people have been hired to help handle the increased work load, Mr. Campbell said, and others have been transferred from other operations onto the drone modification program.

At the peak load level—October through December—an additional increase in personnel will occur on the project, Mr. Campbell said.

The MQM-33B, which is used in in-sight target training, will be (See DRONES, page 6)

Carroll Heads Expanding 747 Program

Northrop Ventura engineers at The Boeing Company plant at Renton, Washington, have begun sending back preliminary designs for the Ventura-built 747 airliner wing fairings.

Basic engineering definitions for the fiberglass fairings are expected to be completed by next month, Program Manager L. B. Carroll said.

With Boeing's recent announcement that the 747 program will continue, Mr. Carroll was appointed permanent program manager at Ventura. He had been acting in that capacity.

The announcement of his appointment was made by M. A. Maurer, Ventura vice president and manager of Production Operations.



Mr. Carroll

"Boeing's announcement has to be considered a boost for the morale of our people on the 747 program," Mr. Carroll said, "even though we already had a letter contract and were treating the program as if it were firm."

Ventura had a letter contract for 50 sets of wing fairings, Mr. Carroll said.

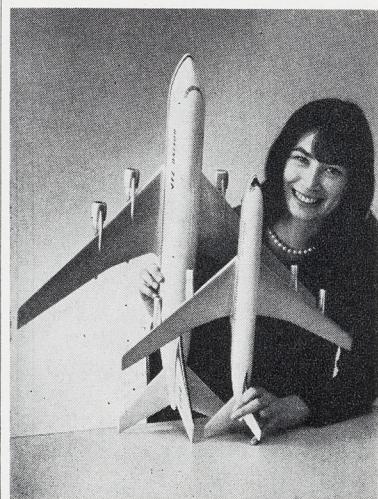
In preparation for production of the fairings, even though production is not scheduled to begin until next year, Ventura officials are leasing two buildings for other manufacturing.

The 747 work will have a significant impact on space requirements, and it has not yet been decided whether the work will be located in the leased buildings.

Also in preparing for production, Mr. Carroll said Ventura has purchased an autoclave, a huge cooking oven for plastics.

The autoclave is 12 feet in diameter and 50 feet long. This autoclave resembles a huge pressure cooker, and will be used to cure the plastic parts.

Between the time that final engineering definition is received and actual fabrication begins, officials will allocate facilities for the wing fairing manufacture, re-arrange existing facilities as the need (See BOEING, page 6)



Boeing 747 compared with Boeing 707.

AT HAWTHORNE

New Facility Casting First Shadows

Northrop Norair's new production facility is casting shadows for the first time as steel framework goes up to form skeleton-like outlines of the new structure.

With the placing of each steel truss, Northrop personnel are getting their first indications of the over-all size of this huge structure.

Here are some figures of general interest:

First, this is not just a building, but a facility, a modern, integrated center for the production of large aircraft structures such as those required on the Boeing 747 program and similar work on other subsonic and supersonic transport programs expected in the future. It will house, under one roof, personnel needed to carry out these programs from Manu-

facturing, Engineering, Administration, support groups, etc.

In keeping with its intended use, it will be called the Transport Facility. It will also retain the internal designation as Plant 3.

Along its east-to-west extremes the building will stretch 700 feet. It will measure 420 feet north to south. And it will be 58 feet, 9 inches high.

On the ground level the facility will have a 294,000-square foot "footprint." The addition of second levels in the form of mezzanines and offices increases the total square footage to approximately 500,000 for the entire facility.

Approximately 84,000 square

feet will be devoted to offices, the remainder to be utilized for production.

Along its western end, the building will have two high bay areas, each 150 feet wide and rising the full height of the building. Next come four other bays, each topped by a mezzanine. The eastern end of the building will contain office areas on two levels.

Walls on the north, west and south perimeters will be concrete and metal siding. The front along Crenshaw Blvd. will be built of plaster, tile, metal siding and windows.

Portions of the building will be available to begin on-sight tool construction by mid-December of (See BUILDING, page 6)

JACK NORTHROP'S DESK

Out of the Archives, a Memento

Interesting stories often emerge from unusual places—such as the forgotten archives of Northrop Norair's Plant 3, which was demolished recently to make way for new production facilities.

During evacuation of the area, a sharp-eyed observer discovered a special item — a desk. In short order a group of veteran Northrop employees established the fact it was, indeed, a special item.

The desk was once used by John K. Northrop, founder of Northrop Corporation and its president until his retirement in 1952.

Working quietly, the veterans rescued the desk and refurbished it. Thomas V. Jones, Northrop president and chairman, heartily endorsed the activity and helped arrange for it to be presented to Mr. Northrop and his wife, Margaret. Accompanying the desk was a book of photographs of historic Northrop-built aircraft and veteran Northrop employees who participated in their development.

Following the presentation Mr. and Mrs. Northrop admitted to being "floored" by all the elements of "Christmas in July."

They wrote to Mr. Jones:

"On partial recovery it became apparent that the event could only have happened with the help of a great many warm-hearted friends. And because the identification and individual thanks to all those involved is impossible, much gratitude and appreciation will have to be compressed in this brief letter to you, with the hope that it will reach all those who participated, directly or indirectly, in this very happy occasion.

"We can only say in addition that the knowledge of this enduring friendship after fifteen years 'out of sight, out of mind,' is one of the happiest events of our lives."



"AN ENDURING FRIENDSHIP"—Mr. and Mrs. John K. Northrop are flanked by Ben Trump (right) and Tom White of Norair as they receive keys to refurbished desk Mr. Northrop once used at Plant 3. Mr. and Mrs. Northrop acknowledged "enduring friendship" they feel for all Northrop people and called the unexpected receipt of the desk "one of the happiest events of our lives."

BOAC PURCHASE BRINGS TOTAL ORDERS FOR BOEING 747's to 41

British Overseas Airways Corporation (BOAC) has ordered six 747 passenger jets from The Boeing Company, bringing total orders for the 747 to 41.

Northrop Corporation is the largest subcontractor in the 747 program, building a 150-foot section of the fuselage, and fiberglass wing fairings which join the wing area to the fuselage.

The BOAC order was authorized this month by the British government. Delivery is scheduled for 1969 and 1970.

BOAC estimated that the six 400-seat passenger planes, plus spare parts, will cost about \$154 million.

Pan American World Airways has the largest order for 747 jets, with 25 scheduled for delivery from September 1969 to May 1970.

Japan Air Lines (JAL) and Lufthansa, a German company, each have ordered three. JAL is scheduled to receive its planes in April through June 1970. No date has been set for the Lufthansa delivery.

Norair will ship the fuselage structures to Renton, Washington, for final assembly at Boeing. The wing fairings will be shipped from Ventura to Renton.

Boeing expects to build 400 of the huge 747 jetliners by 1975.

Field Trip

The NRC Gem and Mineral Club will stage an August 20-21 field trip to Jalama Beach County Park. Juanita Nelson and Rex Russell of Norair and Richard Hicks of Nortronics will accept reservation requests.

TWO SUBSIDIARIES IN ARCHITECTURAL FIELD MERGED

A substantially increased product line has resulted from the merger of Northrop Architectural Systems, Inc. (NAS) and Pacific Curtain Wall, Inc. (Pac/Wall), two of Northrop's wholly-owned subsidiaries.

The merger provides the building industry with single-source supplier of a wide range of quality custom and standard products, according to the company's new chief executive officer, Douglas B. McFarland.

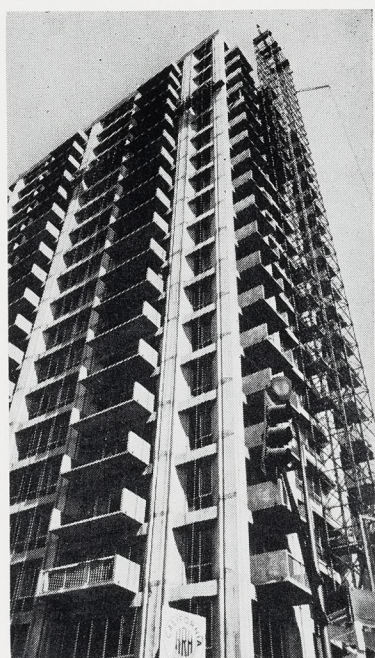
The realignment is the latest step in a long-range corporate plan blueprinted when Northrop formed NAS in 1961 and acquired Pacific Curtain Wall in 1962.

A consolidated corporate office is being set up at NAS's newly occupied production facility in the City of Industry. Pacific Curtain Wall's Long Beach production facility will continue to operate under its own supervisory staff.

The Arcadia line of quality aluminum building products will continue to be manufactured at the Industry plant, and the Long Beach plant will continue to manufacture curtain and window wall and allied products.

"The amalgamation of the special capabilities of the staffs of the merged companies enables both firms to provide a more personalized and complete line of standard and custom products for the building industry," Mr. McFarland, who is the former president of Pac/Wall, said.

Other key executive appointments announced include: Bill Osborn, former operations manager for NAS, to be vice president — Operations; Don White, former NAS vice president — Sales and Marketing, to be acting general manager; Keith Ingebritson, former treasurer of Pac/Wall, to be treasurer of the combined companies.



Pacific Curtain Wall balcony railing (lower left) and Northrop Architectural Systems sliding glass doors on balcony approaches are being installed at Century Park Apartment buildings in Century City, a few blocks from Northrop's corporate offices in Beverly Hills. The two subsidiaries of Northrop recently merged.

Bradford Made Life Member of SCIEA

The Southern California Industrial Editors Association has conferred a lifetime membership upon Charles Bradford, editor of the NORTHROP NEWS for 22 years.

Mr. Bradford becomes one "of only a handful who have been held in such high esteem," according to Robert W. Graf, SCIEA president.

In proclaiming Mr. Bradford a Life Member, the SCIEA executive council said: "Conferment of this class of membership shall be regarded as the highest honor which SCIEA can bestow . . . and shall be reserved for persons who have demonstrated exemplary ability in the profession of industrial editing and performed outstanding services to SCIEA."

Semi-monthly investment of \$18.75 in Series E U. S. Savings Bonds will produce an accumulated value of \$3595 in just seven years' time.

DAVE KENNEY'S VINTAGE ROADSTER

His Heart Is on His Sleeve for Inside-Out Morgan

It isn't every day you see a Morgan three-wheeled roadster — since there are less than a dozen known to exist in the United States.

But David Kenney of Norair Systems Reliability saw one in London, where the sports cars were built from 1913 to 1939, and decided there and then that he wanted one.

"It was during the war," Mr. Kenney said. "This little car, with the engine out in the open, came speeding past me at about 100 miles an hour. When it went by, I saw it only had one wheel in back. None of my friends would believe me. It was like trying to tell them I had just seen a flying saucer."

After the war, Mr. Kenney returned to the United States and joined the Morgan Three-Wheeler Club, an international group with headquarters in London.

He made two trips to England in the last three years, trying to find a vintage three-wheeled Morgan someone would part with.

"Finding a car wasn't so difficult," Mr. Kenney said, "but finding someone who would sell one to me, knowing that I planned to take it out of England, was a different problem."

Finally, still without a Morgan, he returned to the United States and ad-

vertised in a British sports car magazine.

"I got an answer right away, from a man with a 1936 model," Mr. Kenney said, "but it took a while to convince the owner he really wanted to sell it. At first, he said he would. That was in January.

"Later, he wrote me and said he had changed his mind, and wasn't going to sell it. Finally, he agreed to sell. I imagine the antique car clubs over there have blackballed him."

The dark green roadster has a two-cylinder Matchless motorcycle engine, modified to make it water-cooled. The engine is mounted externally in front of the car. It produces 45 horsepower, enabling the 850-pound Morgan to do 100 miles an hour, while averaging about 50 miles per gallon mileage at normal speeds.

It has no doors (you climb in), no shock absorbers and no accelerator pedal.

"There's a hand throttle on the steering wheel," Mr. Kenney said. "So when you're turning a corner, with one hand on the gearshift, you have to use the other hand to turn the wheel and let up on the throttle, and then change gears and accelerate again."

Mr. Kenney had never driven a Morgan until his purchase arrived early this

summer. He does remember — rather vividly — his first ride in one.

"I was in London," he said, "and a man gave me a ride in a 1925 three-wheeler. I asked if he'd sell it, and he wouldn't, but he did take me for a ride.

"He went shooting down a street at about 60 miles an hour, then turned all of a sudden into a little alley about six feet wide.

"See? They don't turn over," he told



David Kenney of Norair Systems Reliability drives through Palos Verdes in three-wheeled Morgan.

me. "That's just a myth that was spread because they have three wheels."

Mr. Kenney bought his 1936 roadster sight unseen, except for pictures the previous owner sent him.

"He (the owner) crated the Morgan up and sent it over," Mr. Kenney said.

"It's in pretty good condition, except for some valve clatter at high speeds and an oil leak in the transmission.

"In the last letter the owner wrote me, he told me to be sure and take it to someone who knows how to work on it, when I need repair.

"Where am I going to find someone who knows anything about them?"

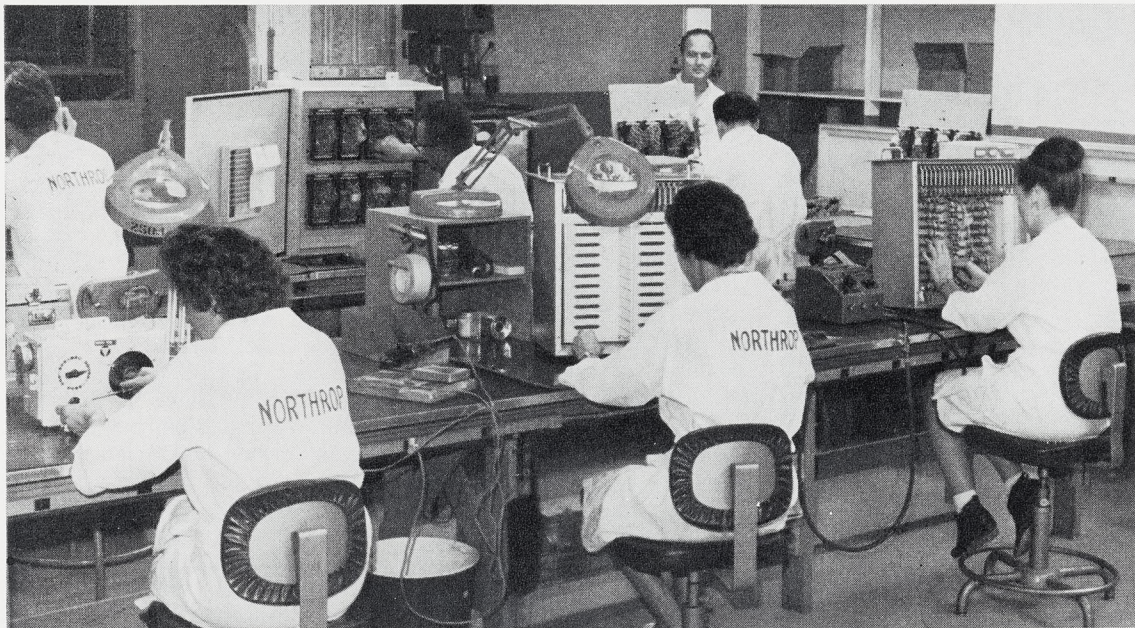
Mr. Kenney isn't worried about service, however.

"There's a place in London that has all the parts," he said. "But I'll have to do the work on it."

Mr. Kenney remembers when he first pulled the Morgan into his driveway and started the engine, certain that nobody else in the neighborhood had ever seen one.

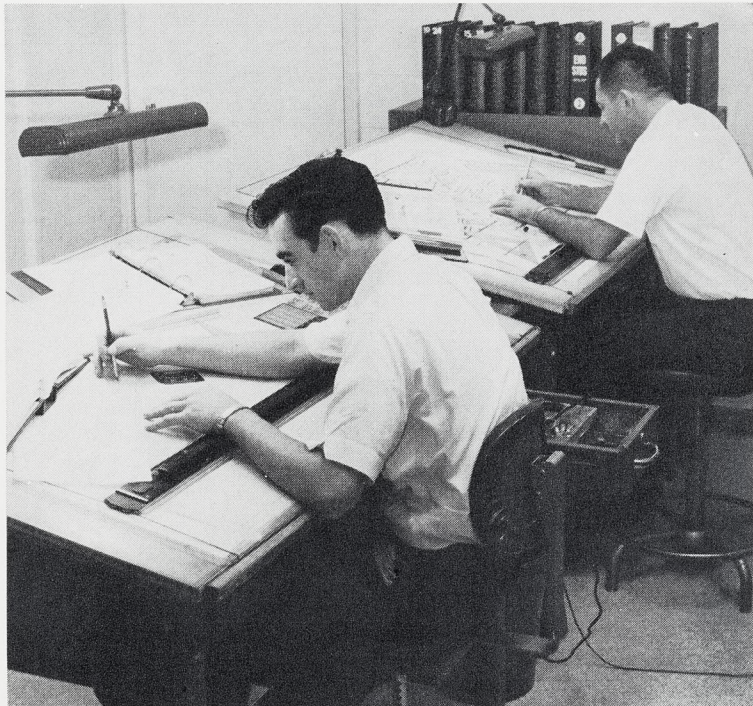
"My next door neighbor came running out of his house, with his wife, turned to me and said:

"Look at that. I just told my wife that only one thing in the world could sound like that — a Morgan three-wheeler."



Northrop/Cape Operations shop personnel assemble patching and distribution panels for installation on Complex 37B at Kennedy Space Center. Facing the camera is Quality

Control Inspector Norman Davis. Preceding fabrication however, is completion of fabrication drawings (right photo) by Gordon Snider, assisted by John Franklin.



SATURN COMPLEXES

Communications for a Moon Port

Among the high-rise buildings and bright lights which have replaced the mosquitoes and palmettoes around Cocoa, Florida, 54 Northrop support operations specialists are supplying and installing the complex communications systems used for the launch of the Saturn booster rocket at Kennedy Space Center.

Being installed for NASA are complete hardware communications systems for use inside the launch control centers and automatic ground control stations, and for all other locations within the launch complexes numbered 34 and 37.

Complexes 34 and 37 will be the country's first moon ports. The Saturn booster, which is presently undergoing test flights at Cape Kennedy, is the forerunner of the vehicle which will send Apollo astronauts on their way to the moon in 1970.

The two launch complexes, located on Merritt Island, were specially constructed for the Apollo/Saturn program.

Communications within the launch complexes are especially critical because buildings are often hundreds of feet apart for safety purposes, according to R. F. (Dick) Jonas, who directs the Northrop/Cape Operations activities.

Northrop engineers and technicians have designed and fabricated communications equipment which have demonstrated an operational reliability of approximately 100 percent over several years of operation.

A single-story, concrete block building on U.S. Highway 1, adjacent to the Merritt Island Launch Area, houses Northrop's engineering and administrative offices, as well as an electronics laboratory and manufacturing facility.

At the Apollo/Saturn complexes, installation crews use a trailer as general headquarters.

The Technical Operations Office, constantly manned by Bob McCorkle and John Nelson, coordinates the multifunction requirements which assure NASA that regardless of last minute changes, inevitable in launch situations, the required communications will be ready for test and launch.

The manufacturing area, under Red Grimley, includes an assembly area and a large cable mold area. In the assembly area, communication

panels are assembled and reworked. In addition, many units of the system are manufactured including patch distributors, headset extension boxes, and line amplifiers. One thousand printed circuit cards for use in the communication system are being reworked and tested.

The air-conditioned manufacturing facility has a capacity of molding as many as forty large cable ends, or one hundred small cable ends, per day and has twelve stations operating for cable fabrication and soldering. A cable preparation area is used for preparation of the cables for molding.

When the cable molding is complete, a special cable tester is used to check for high resistance shorts, continuity, and integrity. A large assembly area is used for wiring, rewiring, and soldering of stations, distributors, and the many other items of communication systems being manufactured.

Still another area is devoted to a machine shop with capabilities for cutting, drilling, and much of the work on the boxes required for the system. A paint room with a complete air ventilation and blower system and lamp drying area is used for painting units.

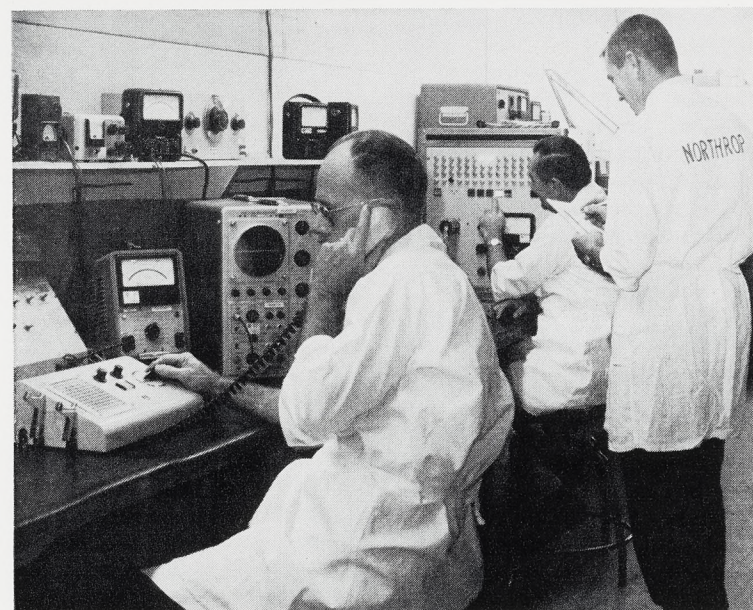
A large temperature and humidity-controlled shipping and storage area can accommodate 2200 cubic feet of equipment on adjustable storage racks. On completion of assembly, units of the system are checked in the test laboratory.

Engineering capability ranges from system analysis and preliminary design to detail design, liaison engineering, manufacturing and installation design, and the writing and publication of operation and maintenance instructions.

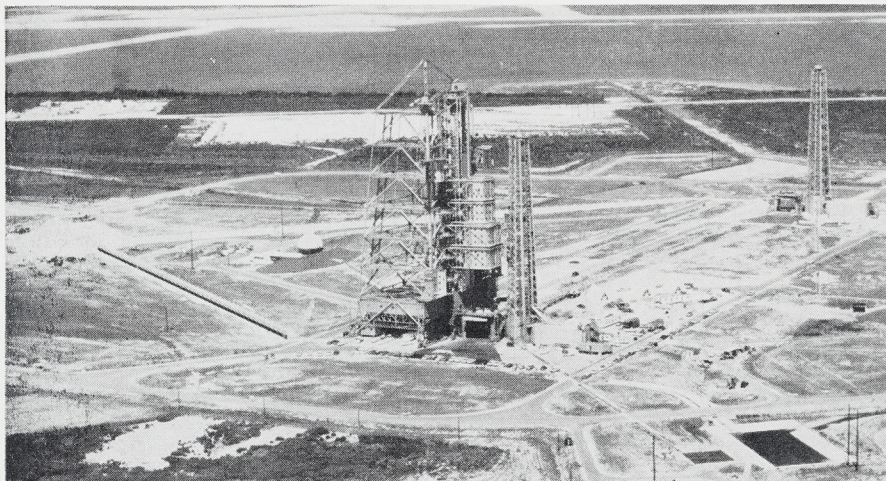
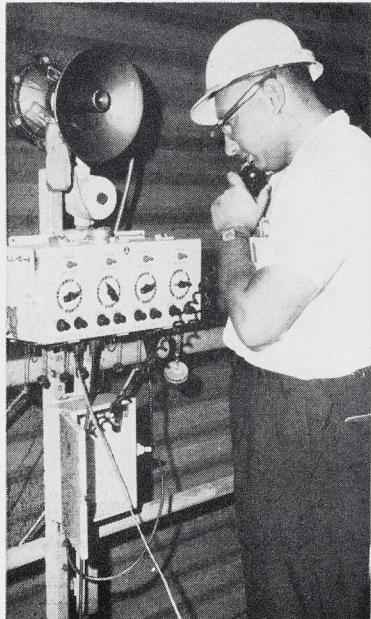
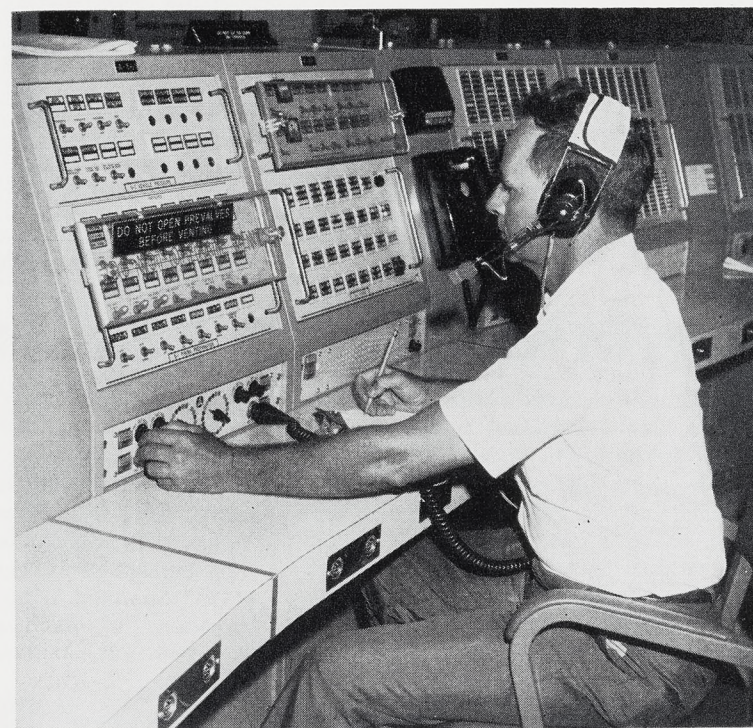
The test laboratory assures the customer that the product is of only the best and most reliable quality. This laboratory, also temperature and humidity-controlled, is equipped to test all Cape Operations-fabricated and vendor-made items for the systems being installed or on older systems being renovated.

The laboratory is capable of testing anything in the communication field from rf to audio, after which all assemblies are certified by the Quality Control Section directed by Jess Huseman.

(See CAPE OPERATIONS, page 5)



Prior to installation (above), A. A. Davidson, Jess Huseman and Rudy Bruna (left to right) conduct final checkout on equipment before installation. Floyd Grady of Site Installation crew (below) continues checkout procedure after installation at fueling director's console in the Launch Control Center.



Among the final steps in systems installation are preparing operations manual by Jocelyn Williams and Iris Supcoe (far left photo). NASA launch personnel (center photo) were shown using part of the Northrop-installed equipment during recent launch of Saturn 1B. Aerial view of Complex 37 (above) gives indication of scattered buildings and facilities.

NASA PROJECT

Airborne Expedition Probes Weather Secrets

Mother nature has been coaxed into revealing some of her innermost weather secrets through an unusual series of airborne expeditions supported by Northrop Corporation personnel.

These expeditions involved experiments carried out in flights at low and high altitude over Caribbean thunderstorms, Amazon jungles, Chilean volcanoes, North, Central and South American deserts, swampland and forested areas.

NASA's Ames Research Center and Goddard Space Flight Center cooperated in conducting the expeditions. Dr. Michel Bader of Ames and Dr. William Nordberg of Goddard headed the respective groups involved.

Ten Northrop Norair men assisted by providing aircraft support under terms of an Ames-Northrop contract for these services.

Frank Schroeder was in charge of the Northrop personnel.

NSA Chapter Plans Orientation Meeting

The Airborne Chapter of the National Secretaries Association will hold its annual orientation meeting for prospective new members August 31 at the Ramada Inn, 9620 Airport Boulevard, Los Angeles.

A panel of well-versed speakers will present "What's My Line" at the dinner meeting which is designed to explain what the NSA is and what the qualifications are for membership.

Deadline for reservations is August 25. Interested parties should contact Verlin Seaman, extension 2131, or Pat Noble, extension 2761, at Norair. Social hour will be at 5:30 p.m., and dinner will be served at 6:30 p.m.



OVER THE ANDES—Norair navigator John W. Kroupa plots the route for the NASA Nimbus satellite-990 aircraft. The six-week program included flights over the snow-covered Andes mountain range (at right), as well as deserts, swampland and the Amazon jungle regions.



nel. Included were John Kroupa, navigator; Frank Brasmeri, flight engineer; Milt Silberber, crew chief; Byron Bolling, flight inspector; Jim Edwards, Ed Mitz, Tom Shackelford, Jack Watson and Pete Wolfe, flight line mechanics.

Ames' modified Convair 990 jet transport, dubbed the "Galileo", was the principal aircraft involved in the six-week program. It logged over 200 hours of flight time without a malfunction or delay with Northrop personnel providing maintenance at a number of remote operating bases during the program.

In addition to its normal bevy of scientific data gathering gear, the "Galileo" was especially equipped with new weather-measuring sensors destined for use aboard weather satellites.

Complicating over-all mission objectives was the exacting requirement of often flying over areas simultaneously with passes of an orbiting Nimbus

weather satellite so that data collected by the aircraft and spacecraft could be later compared.

Tropical areas were of primary importance to the program, since scientists have long felt the earth's weather is created in the tropics. There were special studies of various types of clouds, the moisture content in jungle areas, the energies released in thunderstorms, the amount of infrared radiation various types of soil absorb and emit, and particularly measurements of the earth's heat balance which is felt to greatly influence storm development and dissipation.

After an extended series of flights over varied terrain in the United States, the "Galileo" made a nonstop hop from Ames at Moffett Field near San Francisco to San Juan, Puerto Rico, covering a round-about route to avoid flying over Cuba. The quest there was for thunderstorm information conducted in all types of weather.

NASA's Bob Innis was the chief pilot on this segment.

After a return to Moffett Field, the modified 990 jumped off for Panama, the base of operations for low-level sweeps over the Amazon jungles. With a minimum of navigational aids on the ground, the 990 crew, headed by Pilot Fred Drinkwater, flew exacting routes in both daylight and darkness.

"The Amazon is a most beautiful, but forbidding place," one of the Northrop men said. "At low altitudes, all you could see was miles of lush greenery laced by streams."

From Panama the task force flew to Lima, Peru, for further experiments, then on to Santiago, Chile. The latter route took the force along the crest of the Andes range for approximately 2000 miles, described by a spokesman as "incredibly beautiful". The weather in Chile (where it is now winter) is in direct contrast to that in Panama, the Northrop men found.

Next followed a series of daily flights over the Atacama Desert, said to be the world's driest area.

Hopping over the Andes Mountains, the 990 and its task force next stopped off for day and night flights out of Mendoza, Argentina, before returning to Moffett Field via Panama.

"Our Northrop people were highly impressed by the devotion to duty and the long hours the scientists worked while we were on this program," the Northrop men agreed. "It is a highly rewarding experience to be associated with internationally-famous men and women like these and to be able to contribute to their efforts in a small way."

AIR FORCE MEN EARN MEDALS FOR 'SKOSHI' PROJECT

Two men, an Air Force major and a technical sergeant, have been awarded Air Force Commendation Medals for their work with the "Skoshi Tiger" F-5 squadron at ceremonies held at Williams Air Force Base, Arizona.

Major Clifford G. Carbaugh and TSgt. William E. Bascue, both original members of the team formed at Williams then sent to Vietnam for combat duty, were the honorees.

Major Carbaugh was chief of Quality Control for the "Skoshi Tiger" squadron (the 4503rd Tactical Fighter Squadron). TSgt. Bascue served as an F-5 crew chief.

Lee Ober's Brother Running for Congress

The U.S. House of Representatives election campaign in Colorado (Denver) this November will hold more than just a casual interest for Norair's Lee Ober—her brother will be a candidate.

And the circumstances surrounding the candidacy are rather unusual, since the man in question is currently on duty with the U.S. Marines in Vietnam.

Sergeant Gregg Pearson, Mrs. Ober's brother, is a combat correspondent with the Leathernecks and has been in the thick of action for almost a year. He is a former newspaper, radio and television writer and the author of numerous published works.

He was also executive secretary of the Republican Party in Colorado prior to reporting for duty. He rejected a possible nomination for a Congressional seat before reporting for duty. But at the recent Colorado Republican Party Convention he was nominated by acclamation.

Sergeant Pearson was featured in a special Walter Cronkite CBS-TV news program July 18. He was interviewed at his post in Vietnam.

BENNETT REPRESENTS USA

World Church Leaders Express Views in Switzerland

It's not unusual for a Northrop executive to attend a conference and serve on a committee on science and technology.

But when that meeting is the World Council of Churches' conference on Church and Society—held in Geneva, Switzerland—that is unusual.

Walker G. Bennett, newly appointed NIKE-X project manager for Northrop Space Laboratories' Huntsville Department, returned recently from that two-week conference. He was one of 56 American delegates at the international meeting; one of two representing the Lutheran Churches in America.

Mr. Bennett, formerly chief of Technical Administration at Northrop Ventura, went to Huntsville seven months ago as director of Business Administration.

He became NIKE-X manager on August 1, reporting to J. A. Barclay, Huntsville Department manager.

The former NIKE-X manager, A. C. (Arch) Wallen, has been placed on special assignment, reporting to Jack Mannion, manager of the Manufacturing and Material Department for Norair.

The personnel changes were announced by Roy P. Jackson, Norair vice president and assistant general manager.

In Geneva, Mr. Bennett and other representatives from nations throughout the world discussed topics ranging from the Vietnamese crisis to birth control. Lay-

men from both sides of the Iron Curtain were present, joined by leading officials from Protestant faiths and the Roman Catholic Church.

There were 440 representatives from 80 nations in attendance.

Mr. Bennett served on a subcommittee, "On Men and Women in a Changing Society," of which sociologist Margaret Mead was chairman.

He also was on the "Science and Technology" working group.

Discussing his part at the convention, Mr. Bennett said:

"The openness, the friendliness of the delegates to one another was a thrilling and a precious thing indeed.

"We were a multitude of faiths and nationalities. I recall an instance where, in our morning worship service, I was

holding a hymnal and singing in English. The man to my left, an Englishman, was singing in French. The man on my right, from Czechoslovakia, was singing from the same hymnal, but in German."

Mr. Bennett also spoke of his meeting with conference delegates from Communist countries.

"I was able to discuss the problems of Christian witness," he said, "with a Cuban minister, a Czechoslovakian psychologist, a Russian Church administrator and a Hungarian.

"I believe the conference afforded a valuable opportunity to exchange ideas and share Christian problems with an untold variety of people. It helped to define the goals and methods of Christian action and witness in a revolutionary world."

Mr. Bennett said he believes the meeting "will affect worldwide church thinking for years to come.

"One of the greatest values of the conference was that we could express our views and get our point across, even if it was not agreed upon."

While an employee of Northrop Ventura last year, Mr. Bennett attended a study conference of the National Council of Churches, in St. Louis.

He has been secretary of the Lutheran Churches Board of Social Ministry for four years, and has been on the board for six.



MEETING IN GENEVA—Walker G. Bennett (Note arrow) listens to an English translation as he attends the World Council of Churches' conference on Church and Society, held in Geneva, Switzerland.

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

For Sale

Sofa, contemporary design, pale green fabric, 101" width, custom made this summer at \$867, never used, \$400. Bel Air, 472-2571. A

Sailboat, 10' fiberglass, w/dacron sail & trailer, \$250. Long Bch., GA 7-4197. A

Oldsmobile, 1957, factory air-conditioned, 4-dr. sedan, \$325. Thousand Oaks, 805-495-0507. A

Rifle, Remington nylon 66, .22 cal. auto, chromed w/black stock, 6 mos. old, \$45. Hawthorne, 676-4251. A

Sectional, corner sleeper-type, brown & orange plaid, matching backboard, 2 full single beds, \$100. Torrance, 371-9925. A

House, 1-bdrm., in Ventu Park, \$11,500. Newbury Pk., 805-498-3872. A

Skin Diving Equip., complete, \$45. Lynwood, 632-2642. A

Projector, T.D.C. model Streamliner 500 duo for 2"x2" 35mm 2 1/2"x2 1/2" slides, 500W lamp, a.c. blower, 6" f/3.5 lens w/both changers w/case, \$45. San Pedro, FR 2-6585. A

Projector, movie-type, 8mm, Mansfield Holiday, ultra-automatic, used 3 times, \$70. Box 1601. A

Refrigerator, lge. size RCA Whirlpool, 170 lb., pull-out bottom freezer drwr., cost \$550; \$200. Gardena, DA 4-7623. A

Pickup, 1951 Ford, good tires, new brakes, r/h, trailer hitch, \$275. Gardena, 532-4368. A

Range, O'Keefe & Merritt, gas, w/griddle, grillvator, \$65. Hawthorne, 679-2983. A

Auto Parts, block, heads, manifolds, carb. from 430 cu. in. 1964 Lincoln, \$75 or sell sep. Inglewood, OS 6-3095. A

Pups, German shepherd, A.K.C. championship stock, all black & black & silver, \$125. Lawndale, 675-6283. A

Table, round & end table set, white w/brass legs, \$65. Torrance, 371-5916. A

Power Shop, DeWalt radial arm-type, model 925, Banex table, dual volt motor 120/420 V., bltin roto grip motor, other access., cost \$285; \$150. Hawthorne, OS 6-5250. A

Mobile Home, Kit Golden State, 55' lge., 12' wide, ext. living rm., completely furn., many extras, across from Nortronics Anaheim, \$10,000. Anaheim, 714-525-2617. A

Outboard Motor, 1963 Evinrude, 75 hp, push button control, all elec. w/alternator, \$625. Hawthorne, 676-7109. A

Stove, O'Keefe & Merritt, chrome top, \$50. Norwalk, 864-7673. A

Oldsmobile, 1961 2-dr. h/top, r/h, w/w, p/s, p/b, auto. trans., \$1185. Fullerton, 714-528-8582. A

Lot, R-1, in Calif. City, near new elem. school, \$350 dn., \$35 mo., \$3500. P.V., 377-7156. A

Bicycles, 2 boy's, 20", Sting Ray-type, \$25. Long Bch., 596-2039. A

House Trailer, 38'x8' Stewart Coach, eastern blt., fully furn., new awning, \$995. Hermosa Bch., 374-3638. A

Ford, 1965, Galaxie 500 convt., low mileage, \$2200. L.A., PL 6-2587. A

Surfboard, Shool, 9'0", \$50. Inglewood, 678-2728. A

Honda, 1965 250 Scrambler, big jets, \$500. Inglewood, 676-8982. A

Golf Clubs, left-handed, 2 thru 9 irons, 1, 2, 3 woods, \$35. Torrance, 324-9193. A

Cabin Cruiser, 24' Essence, twin screws, twin rudder, fiberglass, range finder, depth sounder, bait tank, other extras, \$1500. Lawndale, 371-7311. A

Juicer, new, Acme model 5001, cost \$125; \$100. Manhattan Bch., 379-6931. A

Volkswagen, 1966, 1600 TL fastback, 500 miles, \$2100. Anaheim, 714-828-3718. A

Falcon, station wagon, 1961, new tires & paint, o/haul trans., \$350. Hawthorne, 675-1982. A

Car Cooler, Wright's, 6 volts, interior-type, \$25. Inglewood, 756-9697. A

Organ, Hammond M-3 spinet w/percussion, unmarred maple finish, \$795. San Pedro, 831-5837. A

Ladder, extension-type, 32', \$35. Inglewood, 756-9697. A

Ford Falcon, 1965, Sprint, r/h, p/s, fac. air, 2500 miles left on factory guarantee, \$2250. Long Bch., 433-2202. A

T-Bird, 1954, all power, \$2500. Camarillo, 805-482-6740. A

Truck, 1957 Ford V-8 w/pullman camper, good tires, \$550. Redondo Bch., 374-3809. A

House, 3-bdrm. & detached, beam-ceiling den, 1 block to elem. school, near Harbor Fwy., panel liv. rm., fenced playyard, 10 min. to Norair, \$21,900. Gardena, DA 9-2904. A

Pontiac, 1964 Star Chief, 4-dr., auto. trans., p/s, r/h, clock, 1 owner, \$1850. Lawndale, 370-3821. A

Headboards, 2 maple twin size, bookcase-type, \$50. Placentia, 714-524-1787. A

House, 2-bdrm., full dining room, fireplace, dble. garage, \$20,950. Inglewood, OR 1-3860, FR 5-5097. A

Yamaha, YD53, 250 cc, 1965, 1700 miles, \$175 & take over pymts., approx. \$400 bal. or \$575. Torrance, 327-1779. A

Refrigerator, 2-dr. cross top freezer, 13.2 cu. ft. Frigidaire, \$60. Hawthorne, OS 6-5219. A

Boat, 17' runabout, 75 h.p. outboard, Evinrude, 22-gal. cap., many extras, \$750. Inglewood, 679-5827. A

For Sale

Camper, 7', sleeps 4, ice box, stove/ sink, \$250. Torrance, 371-1006. A

Triumph, 1964 TR 6, 2500 miles, \$850. El Segundo, 374-7039. A

House, 3-bdrm., 2-bath, lge. covered patio, bltins, 5 1/4% mortgage, \$141. mo. pymts., \$27,500. Torrance, 325-0039. A

Yamaha, Trailmaster 80, never ridden, factory guarantee, \$250. Hawthorne, 644-3162. A

Ford, 1958 2-dr. sedan, r/h, new motor, auto. trans., V-8, \$395. L.A., WE 4-5640. A

Rug, silver-tipped Himalayan bear skin, beautiful head, \$450. Hawthorne, OS 5-3892. A

Jaguar, 1961 MK IX sedan, stan. equip., b/seats, leather uphol., wood dash & trim, sunroof, disc brakes, p/s, p/b, other extras, \$1895. Redondo Bch., 374-2361. A

Camera, Nikon, 35mm, rangefinder model w/50mm f1.4 Nikkor sc. & 35mm f3.5 Nikkor c., 135mm f-4 Zeiss Sonnar lenses, Universal finder 35-135mm, lens shade & filter mount, w/cases, \$160. Hermosa Bch., FR 2-8547. A

Triumph, 1962, 650 cc, \$575. Redondo Bch., FR 2-4071. A

Outboard Motor, 25 h.p. Evinrude, controls & 5-gal. gas tank, \$75. Gardena, DA 4-8853. A

House Car, 1960 Thames, self-contained, 4 cu. ft. elec. or butane refrig., \$895. Manhattan Bch., 372-4404. A

Chevrolet, 1957 convt., needs top & paint, \$225. Hawthorne, 675-9702. A

Volkswagen, 1300, 1966 sedan, AM/FM radio, deluxe int., w/w, camber compensator, s/ belts, \$1600. Manhattan Bch., 376-1041. A

Falcon, 1963, auto. trans., r/h, wire wheels, will take \$200 for equity, \$400 bal., \$600. Hermosa Bch., FR 2-1013. A

T-Bird, 1961, air cond., r/h, full power, \$1550. L.A., GR 2-8377. A

Vacuum Cleaner, G.E. canister, 3 yrs. old, \$10. Torrance, 327-4585. A

Golf Clubs, 4 woods, 1966 Spalding Top Flite, reg. professional, D-3 med. shaft, 6 mos. old, \$65. Inglewood, OS 9-5731. A

Helmet, boy's football-type, age 8-12, \$4. Gardena, 324-9373. A

Saws, tilting arbor, 10", 1-h.p. motor, 4" jointer & wood lathe w/6 chisels on portable stand, \$150. Hawthorne, OS 5-3080. A

Pups, German shepherd-collie, \$10 ea. Lawndale, FR 0-9440. A

Washer, auto., Kenmore, \$50. Torrance, FR 5-4574. A

Hi-Fi Set, Heathkit 25 W amplifier, leco tuner, Bogen turntable, Jensen 3-way speaker system, \$65. Westminster, 714-892-5801. A

Home, 3-bdrm., 1 1/4 bath, feaced, landscaped w/sprinklers, fireplace, ash paneling, kitchen w/bltins, \$31,000 or \$235 mo. lease. P.V., FR 8-5475. A

Sprite, 1959, 1962 engine & trans., side curtains & tonneau, plus extras, \$350. Port. Bend, 377-2921. A

Plymouth, 1957, 2-dr. sedan, good tires & eng., body needs paint, \$100. Venice, EX 9-2003. A

Pressure Cooker, canning size, 24 qt., Presto, \$12. Pac. Palisades, 454-1963. A

Refrigerator, 9 cu. ft. Admiral, \$40. Torrance, 324-2992. A

Acreage, near Rosamond, in Antelope Valley, E. Kern water dist., 10 acres, terms, \$595 acre. Torrance, FR 8-1026. A

Chevrolet Impala, 1962, 4-dr. sedan, r/h, p/s, p/b, auto. trans., 327 4-barrel eng. \$1300. Redondo Bch., 370-9795. A

Wig, black human hair, & case, orig. cost \$325, almost new, \$250. Inglewood, 674-1730. A

Scout, Int. Harvester, 1962 Warn. hubs & o/drive, 4-wheel dr., 9.15x15 flotation tires, 12V/110V ac/dc generator, steering stabilizer, hvy. duty clutch, \$1700. Hawthorne, OS 6-3388. A

House, 3-bdrm., paneled den, lge. all-elec. kitchen, patio, block wall fencing, 4 1/4% loan or refinance, \$20,950. La Mirada, 944-1734. A

Dodge, 1951, near new tires, \$150. Lawndale, 644-3427. A

Home, 5-bdrm., 3 1/2 bath, on view lot, \$77,000. W. Covina, 339-8008. A

Boat, 14' Nylox runabout, 35 h.p. Johnson, trailer, \$640. Box 1602. A

Record Changer, Garrard, type A, \$50. Inglewood, 674-6395. A

Boat, 12' plastic car top-type, 3/8" thick plastic, wide beam, 3 seats, w/flotations underneath, \$75. Hawthorne, OS 9-7123. A

Outboard Motor, 100 h.p., 1965 Mercury, \$900. Hawthorne, 327-5229. A

Bicycle, boy-girl 20", \$15. Torrance, FR 9-5690. A

Cadillac, 1960, Coupe de Ville, all extras, fac. air, 54,000 miles, \$1450. L.A., 472-5284. A

Chevrolet, 1959, 348, auto., tuck & roll, \$675. Hawthorne, 714-892-7610. A

Porsche, 1960, convt., 1-owner, \$1400. Fountain Valley, 714-962-2747. A

Carpeting, light green acrilan, approx. 50 yds., \$200. L.A., AX 2-1793. A

Encyclopedia Americana, 30 vol., 1963 edition, incl. 1964 thru '66 yearly supplements, 10 vols. Book of Popular Science, plus 1 yearbook, 1965, w/bookcase, \$200. Redondo Bch., 376-8285. A

For Sale

Rollaway Bed, on casters, \$7. So. Gate, ME 3-2395. A

Oldsmobile 88, 1958, p/b, p/s, r/h, dual 90 tires w/15' travel trailer, sleeps 4, complete unit, \$700. Torrance, 328-1076. A

Honda, Dream 300, 1965, windshield, luggage rack, new rear tire, & saddle bags, \$550. Torrance, DA 8-2642. A

Cocker Spaniel, male, blonde, 3 1/2 mos. old, shots, AKC, \$45. Torrance, FR 1-0629. A

Pups, German shepherd, purebred, no papers, \$15. Canoga Park, 341-0517. A

Edger-Trimmer, Craftsman, 3 h.p. 4-cycle eng., \$35. Hawthorne, 676-6122. A

Lot, 80'x100', Snow Summit, Big Bear Lake, 1 blk. from ski slope & inn, all utilities in financing avail., \$6950. Fullerton, 714-525-1677. A

Rambler, station wagon, 1960 4-dr., stick shift, 6-cyl., 42,000 miles, \$550. Fullerton, 714-525-7685. A

Cabin Cruiser, Glasspar club mariner, 19', Volvo inboard-outboard & trailer, \$2395. Hermosa Bch., 374-7290. A

Wig, 100% human hair, frosted, head form & pins, never worn, \$50. Long Bch., 433-2202. A

Honda, 1962 deluxe, 305 cc, many extras, chrome fenders, racing clutch, \$400. Torrance, 378-8181. A

Oil Filters, Frantz, 2 new, 1 used, \$18 ea.; used, \$9. Los Alamitos, 430-4407. A

Electric Guitar, Tiesco Del Rey dble. cutaway, tremolo bar, \$70. Inglewood, 673-1589. A

Mattress, box springs, twin size, \$10. Long Beach, GA 3-1363. A

Camera, Kodak Signet 80 w/carrying case, 90m.m. telephoto lens, flash gun, \$80. Hawthorne, 676-2383. A

Ford, 1959, 6-cyl., standard trans., w/w, radio, smog device, recent trans. o/haul, \$250. Gardena, 676-0432. A

Corvette, 1961, tonneau cover, 4-speed, positraction, 270 h.p. two 4-barrels, r/h, \$1700. Canoga Park, 882-0248. A

Washer, Maytag, 2 yrs. old, coppertone, \$100. Redondo Beach, FR 5-6364. A

Chevy, 1959, Bel Air, 2-dr., \$375. Inglewood, 674-1847. A

Porsche, 1964 "C" Coupe, Blaupunkt radio, \$3300. L.A., GR 9-5653. A

Acreage, Hesperia, R2 lot, Palm Springs panorama, \$5000. Redondo Beach, 370-4641. A

Condominium, 3 bdrms., 2 1/2 bath, inter-com, fireplace, pool, clubhouse, \$3900 equity for \$1300, balance, \$24,700. Torrance, DA 7-2831. A

Mountain Cabin on hillside lot near Frazier Park, Mt. Pinos area, water heater, refrig., elect. range, septic tank, cess pool, \$6600. Gardena, OS 6-7265. A

Stereo Amplifier, 50 watts per channel, \$100. W.L.A., 277-2549. A

Honda, 1965 Super Hawk 305, scrambler bars, two helmets, \$550. L.A., 277-2549. A

Chevy II, 1964 wagon, auto. trans., new tires, r/h, \$1475. Gardena, 324-0867. A

Fiat, 1960, 600, \$100. Diamond Bar, 714-595-6724. A

Beer Bar, custom made, holds keg, \$150. Hawthorne, 679-8009. A

Wanted to Buy

Sail Boats, Sabot, pram or similar size w/sail. L.A., 474-8640. B

Outboard Motor, 5 h.p. Evinrude or Johnson, will pay up to \$50. Torrance, 325-8212. B

Used Uniforms for Hawthorne Christian School, boys size 5 or 6. Gardena, 327-0701. C

For Trade

Trade Blue Chip stamps for S&H green stamps. Santa Monica, EC 3-5983. C

Tropical Fish, 5 large angel fish, trade for smaller fish. Westchester, OR 2-4828. C

FREE (To Be Given Away)

Kittens, ready about Sept. 16, blacks, grays, tigers with or without tails, part Burmese & part bobcat. L.A., 277-2549. D

Clothes Poles, 2, heavy duty, good shape. Torrance, 325-8134. D

Rentals Offered

House, 2-bdrm., rear, water & rubbish pd., near Hawthorne plant, \$95 mo. Torrance, FR 8-0500. E

Apt, 2-bdrm., 1-bath, deluxe, small child OK, near Northrop, \$130 mo. Hawthorne, OS 5-2772. E

Apt, 1-bdrm., furn., all bltins, pvt. deck, lge. pool, subterranean parking, near Northrop, \$140 mo. Lawndale, 670-6084, 679-2117. E

Sleeping Rooms, close to Northrop, shopping & transportation, \$32 to \$40 mo. Hawthorne, OS 5-5850. E

Apt, furn., 3-rm., adj. Century City, incl. all utilities, 1 person, \$125. W.L.A., 277-0594. E

Apt, 2-bdrm., 1 1/2 bath, near schools & park, furn. \$155 mo.; unfurn., \$120 mo. Inglewood, 644-2565, 672-1890. E

Apt, 2-bdrm., bltins, disp., Thermo heat, carport, water & trash pd., \$100. Torrance, 320-2827. E

House, 2-bdrm., \$90 mo., Hawthorne, OS 6-3053. E

House, 2-bdrm., unfurn., fenced yd., gar., children OK, \$100 mo. Hawthorne, 679-3022. E

Apt, 1-bdrm., bltins, disp., furn., \$115; unfurn., \$100 mo. Hawthorne, 675-9540, 675-3935. E

Apt, 2-bdrm., 1 bath, disp., bltins, gar., water & trash pd., teenager OK, no pets, \$125 mo. Hawthorne, OS 6-4658. E

Cabin, Big Bear Lake, modern, sleeps 7 to 9, \$18 w/end; \$50 wk., Bellflower, TO 7-0662. E

Apt, 2-bdrm, unfurn., fenced yard, children OK, close to Northrop, trash & water pd., gar., \$95 mo. Hawthorne, 325-5705. E

Apt, 1 & 2 bdrm., pvt. balconies, closed gar., soundproofing, hot water & trash pd., \$95 & \$125 mo. Torrance, FR 5-0867. E

Unit, 2-bdrm., on waterfront, Huntington Harbor, 46' boat slip, gar., year lease, \$300. Orange, 714-637-8648. E

Girl wanted to share furn. apt., utilities pd., linens supplied, \$15 wk. Hollywood, HO 4-1084, AT 4-5698. E

Apt, 2-bdrm., unfurn., near school, 5 min. from Northrop, \$90 mo. Torrance, 675-4051. E

Bachelor Apt, all utilities pd., 2 blk. to Norair, \$85 mo. Hawthorne, OS 6-7417. E

Vacation Cabins, Bass Lake, avail. Sept. 3, pvt. deck & boat dock, sleeps 7, \$115 wk. Box 1603. E

Vacation Cabins, Lake Gregory & Crestline, \$25 w/ends, \$60 wk. Venice, EX 1-2040. E

Duplex, front unfurn., 2 bdrm., disp., closed gar., 5 min. to Norair, \$110 mo. L.A., PL 4-1964. E

Cabin, Green Valley Lake, \$35 w/end, \$60 per wk. Torrance, 320-2002. E

Apt, deluxe, 1 bdrm., pool, \$95 mo. Redondo Bch., 376-2117. E

Apt, 1 bdrm., unfurn./furn., carpet, drapes, air cond., 20 min. to Norair, \$95/\$110 mo. Mar Vista, 391-7781. E

Apt, 3 bdrm., 2 baths, laundry room, dishwasher, carpet, fireplace, \$195 mo. inc. utilities. Lomita, 325-5973. E

Rentals Wanted

Would like to rent pickup & camper for 1 week late September or early October. Hermosa Bch., 376-8062. F

Child Care Offered

Experienced care for 2-5 yr. olds, reasonable rates, near El Segundo & Crenshaw Blvd. Gardena, DA 3-0955. G

Baby Sitting, after 5 p.m. during weeknights, anytime on w/ends, responsible adult. Box 1604. G

Going my way?

Rides Wanted

7 a.m. — 3:45 p.m.

Chapman & Hewes, Orange. L. R. Slininger, Norair, ext. 2105, 2106. 2

7:24 a.m. — 4:05 p.m.

Paramount Blvd. & Stewart & Gray Rd., Downey. Betty Keeton, Maple, ext. 4281, 869-4608. 1

7:30 a.m. — 4:12 p.m.

Santa Ana, Tustin, El Toro Area, El Toro. Richard Steed, Norair, ext. 1037, 714-837-8963. 3

San Diego Fwy. & Beach Blvd., Garden Grove. William E. Brown, Norair, ext. 1956, 531-5391. 3

8 a.m. — 4:42 p.m.

Inglewood Ave. & 134th Pl., Hawthorne. Dorothy L. Muzik, Norair, ext. 2123, 2470, OS 6-0790. 5

Inglewood Ave. & 190th Torrance. Jerry L. Peterson, Norair, ext. 2125, FR 1-1096. 5

Airport Blvd. & 96th St., Westchester. Blanche Miller, Norair, ext. 2264, 645-8702. 5

Rides Offered

7 a.m. — 3:45 p.m.

Santa Ana, Tustin, El Toro Area, El Toro. Richard Steed, Norair, ext. 1037, 714-837-8963. 13

San Diego Fwy. & Beach Blvd., Garden Grove. William E. Brown, Norair, ext. 1956, 531-5391. 13

8 a.m. — 4:42 p.m.

Inglewood Ave. & 190th Torrance. Jerry L. Peterson, Norair, et. 2125, FR 1-1096. 15

Airport Blvd. & 96th St., Westchester. Blanche Miller, Norair, ext. 2264, 645-8702. 15

Personals

Ironing, in my home, \$1 hr. Hawthorne, 644-2440. L

We wish to express our deep appreciation for the kindness & sympathy of our friends at Norair during our bereavement & the death of our wife & mother. G. E. MUSK, MRS. JACKIE GALICHON. L

For Sale or Trade

Yamaha, 1964, 250 cc YDS-2 rebilt. to YDS-3, \$395 or trade for car. Rolling Hills Ests., 375-7038. M

Thunderbird, 1961, p/s, p/b, p/w, r/h, auto. trans., low mileage, \$1350 or trade for Volkswagen. Torrance, DA 3-2144. M

Utility Trailer, 4'x6', \$65 or trade for motorcycle trailer. Torrance, 323-0783. M

Tape Recorder, record & playback stereo on 6" reel, RCA cartridge, Silvertone, detached speaker, 2 microphones, 2 mic. stands, \$125 or trade for shotgun, Browning, 12 ga. or 20 ga. pump action. Buena Pk., UN 3-2769. M

Lawnmower, 4-cycle Johnson eng., reel-type, \$30 or trade for rotary-type lawnmower. Torrance, 375-6467. M

Accordion, 120 bass Scandalli, \$100 or trade for portable tape recorder of like value. Box 1605. M

Bowler Gets 298 —But Misses Two

There are a couple of bowling pins at the 101 Bowl, Harbor City, that Norair's Herman Wade would be glad to annihilate—they kept him from his first perfect game recently.

As it is Mr. Wade had a lot to be proud of, a 671 series made up of games of 201-172-298. Not bad for an 180-average kegler.

A strike on his last ball would have garnered the 300 game for Mr. Wade, but he got a 7-10 split instead.

CAPE OPERATIONS

(Continued from page 3)

A. A. (Davy) Davidson, who works in the test lab, is an avid sailor. He has built a forty-two foot ketch to sail the Indian and Banana Rivers and expects to take it out for some real salt river sailing this summer on a shake down cruise in the ocean. Walt Wood of Project Liaison has disposed of his sailboat, the "Native Dancer", in favor of a power "stink pot". And Bob McCorkle has a submarine.

Fishing is always good in the area. There are some experts at that too. Engineer Fred Baldwin and Charles Chasteen of Administration spend spare moments with hook and line. Iris Supcoe, secretary to the Base Administrator, collects islands — whenever she has a few days to break away, she "collects" (visits) another island in the adjacent West Indies. There's a budding pilot in the group too; Engineering Technical Assistant Art Johnson has just received his private pilot's license.

Just a few miles southeast of the Cape Operations facility, in Cocoa Beach, is the Northrop

Corporate Office. Nancy Mabrey, Herman McDonald's efficient secretary at the Cocoa Beach office, has recently completed two years as President of the Cocoa Beach Chapter of the National Secretaries Association, the second Norcrafter to hold the position.

There is ample capability for support of other Northrop groups which may contemplate testing at Cape Kennedy, since personnel have experience in inertial guidance systems (Snark and Skybolt), down range tracking, flight testing, space systems (Ranger), launch facility design and installation, thrust stand instrumentation (Titan), clean room design and operation (Holloman and Elgin), support equipment (Polaris), flight test and data reduction, and material and process engineering.

Personnel also have years of field test experience. Administrative experience in field facilities has brought to Cape Operations the qualities necessary for successful operation at a considerable distance from Northrop's West Coast operations.

Valley NAA Group Judged Second in National Ratings

The San Fernando Valley Chapter of the National Association of Accountants has been judged second highest in the nation in inter-chapter competition.

The Valley Chapter has 21 members from Northrop Corporation, including six from Ventura, seven from Nortronics (including four from NARD), four from Corporate offices, two from Norair and two from Northrop Architectural Systems.

The NAA has more than 200 chapters in 50 states, and 169 of these were eligible to compete. The Valley group was second to San Jose in the point totals.

Points are acquired through acquisition of members, member attendance at monthly technical meetings, submission of technical papers, publication of a monthly newsletter, quality of reports from officers, and special activities, such as plant tours and social events.

For finishing as national runner-up, the group received the Remington Rand Trophy at the NAA convention in New York.

Ward Lancot, Ventura senior accountant, is vice president of the chapter. Dan Cashier, Ventura group administrator of general accounting, is director of programs, and has been named most valuable member.

DRONES

(Continued from page 1)

used by Army automatic weapons battalions.

The new cylinders and pistons are of identical size and weight as their predecessors, so no changes in balancing are needed, Mr. Campbell said.

New propellers are being installed along with the cylinders and pistons. The blade is slightly different from the previous one.

The contract was made between Northrop Ventura and the U.S. Army Missile Command at Redstone, Alabama.

A TRI-SERVICE EFFORT

Ted Parker to Head TIPI Organization

The Tactical Information Processing and Interpretation (TIPI) program will be headed by Ted Parker, a 10-year Northrop veteran.

The announcement was made by Fred Stevens, Corporate vice president and Nortronics general manager.

TIPI is a joint effort of all United States military services to develop an intelligence system that will provide military commanders with faster and better battlefield information.



Mr. Parker

The Nortronics team, headquartered at Anaheim, is providing systems engineering and technical direction for the over-all program under terms of a \$4.1 million contract.

Basic objective of the TIPI program is the development of field intelligence processing units

designed to help military services keep pace with modern aerial and surface reconnaissance equipment.

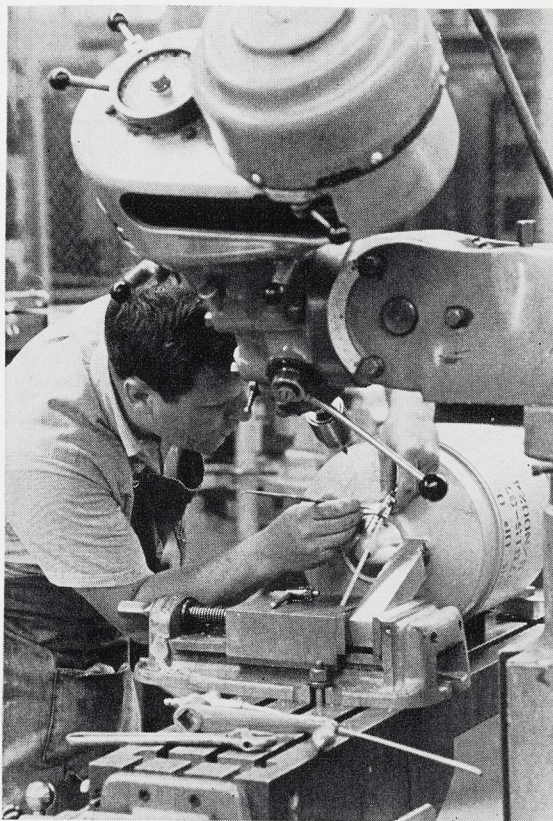
Contained in compact mobile units, these information processing centers will be available for rapid deployment to any location in the world. They will be easily adaptable to any tactical situation, according to Program Manager Parker.

The Department of Defense has established a TIPI Joint Service Program Office at Wright-Patterson Air Force Base, Ohio—the first tri-service system project office ever created.

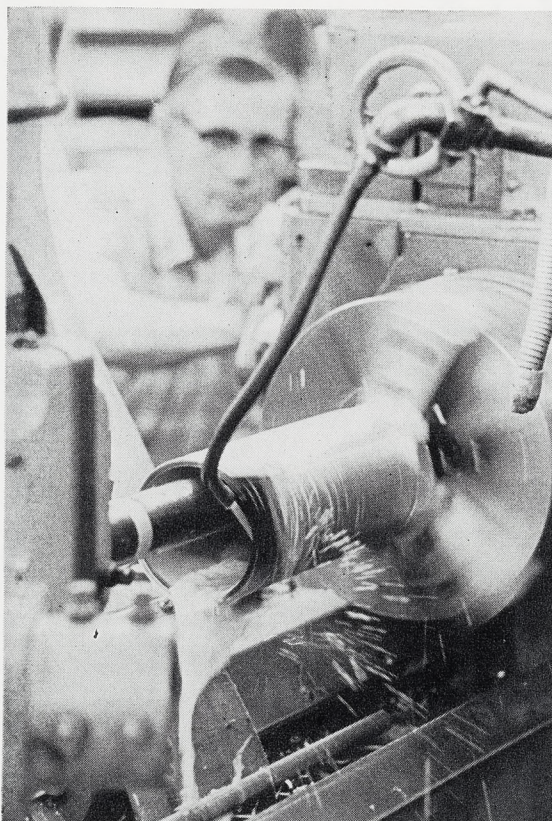
In operation for more than 15 months, the TIPI system office has already monitored a series of study contracts involving various concepts in the over-all program.

The Nortronics organization includes specialists in such fields as intelligence systems, photo processing, photographic reproduction, electro-optics, electronics, data processing and information dis-

BORING WORK



Milling machinist Ronald Harrison (at left) prepares to drill a hole for the Apollo landing system drogue parachute mortar tube, while Melvin Pierceall, a lathe machinist,



bore the inside diameter for the Apollo pilot parachute mortar tube. The chutes are placed inside the tubes as part of the over-all Apollo Earth Landing System.

Midseason Slump Strikes Ventura Softball Squad

Two weeks can mean as much in Conejo Recreation and Parks Department softball as it can in the National League pennant race.

Two weeks ago, following three straight wins, Northrop Ventura

Photos on this page

had a 4-2 record and was tied for second place.

As this week began, the Venturans were 4-4 and were in fourth place.

This came about from losing back-to-back 7-0 decisions to Neilson's Plastering and Technology Instrument Corporation.

On Tuesday, the Venturans were scheduled to play Von's Market, the first place team. Von's had a 7-1 record going into the game.

The team plays at 6:30 p.m. each Tuesday at Thousand Oaks High School.

BUILDING: Integrated Center For Large Aircraft Production

(Continued from page 1)

this year. Total occupancy is expected in April.

First major utilization of the new Transport Facility will find Northrop carrying out its commitments on the Boeing 747 transport program. As an associate of The Boeing Company, Northrop will design and produce the major passenger-carrying portion of the 747 fuselage. The 150-foot-long fuselage structures will be built in sections and transported to Boeing for final assembly.

The Boeing Company has started construction of a huge final assembly facility for the 747 transport. It is located at Paine Field, near Everett, Washington, which is 20 miles from Seattle.

Almost double the size of the Boeing 707, the 747 will carry up to 490 passengers on transcontinental and transoceanic

routes at speeds of more than 600 miles per hour.

A Northrop Norair engineering team has been at Boeing for several months working on the preliminary design of the Northrop portion of the program.

SST

(Continued from page 1)

more, body structure and vertical tail structure; North American Aviation, Los Angeles, outboard wing, and AVCO Corporation, Nashville, Tennessee, center wing structures.

Among major subcontractors yet to be selected are those which will build the landing gear and propulsion pod structures. These subcontracts will total more than \$25 million for prototype construction. For production of 200 SST airplanes, landing gear and propulsion pod subcontracting will amount to an additional \$300 million.

The Boeing SST design incorporates a variable-sweep wing. By taking off with its wing extended, the 300-passenger SST will be able to take off and land on shorter runways than many present jet airliners.

'Thank You' Received for Satellite Job

Production personnel at Northrop Ventura have received a big "thank you" from Philco Corporation's Western Developmental Laboratories for a contract completed recently by Ventura.

Under the four-month agreement, Ventura supplied WDL with honeycombed aluminum base plates, upon which WDL mounted seven communications satellites. The satellites were successfully launched in June.

G. G. Van Tilburg, manager of Procurement for WDL, wrote in a letter to Ventura Marketing:

"Please accept our sincere thanks and appreciation for the wholehearted cooperation of the management and personnel of Northrop Ventura extended to Philco-WDL.

"Your contribution made possible our completion of the seven communication satellites which were successfully injected into orbit June 16, 1966."

The intricate assemblies, made of aluminum "skin" bonded to the honeycombed structure, were used in the launching of the satellites.

Three complete sets were made—one set of prototypes; one for the actual launching; and one for backup.

L. B. Carroll, project manager for the program called the letter from Philco "evidence that Northrop Ventura had well qualified people performing an important job for Western Developmental Laboratories.

"Philco was pleased with the job, and this reflects upon the people involved in the planning and construction of the intricate, sophisticated assemblies."

BOEING

(Continued from page 1)

arises, move in additional equipment, design and build tooling, and begin a production training program for 747 program employees.

Delivery of the first sets of wing fairings from Ventura to Boeing is scheduled for May 1968.

In announcing that his firm will proceed with 747 plans, Boeing president William L. Allen said 200 of the huge jet aircraft will be built by December 1972 and 400 by December 1975.

The 747 will carry 350 to 490 passengers at more than 600 miles an hour.



IN FOURTH PLACE—Members of the Northrop Ventura softball team take time out before a ball game to pose for the 1966 team picture. In the midst of a difficult schedule, the team is in fourth place. Front row, from left, are Andy Andrews, Gene Linhart, Dave Coe, manager Chuck

Taylor and John Morrison. Back row, from left, are Ralph Reeves, Bob Wulff, Bill Gavin, Dale Thomson, Ron Lancaster and Ed Frangos. Not pictured are Bill Higgenbotham and Herb McKinney. At left, Ralph Reeves shows how the new uniform shirts look (photos by Dan Cashier).

Apollo/Saturn Test Meets Objectives

A 5-1/2-ton, cone-shaped Apollo command module skipped through the earth's atmosphere like a rock across water during its return to earth last Thursday in the second unmanned test flight of the program to land U.S. astronauts on the moon.

The spacecraft was thrust 706 miles into space aboard an up-rated Saturn I launch vehicle from Cape Kennedy's Pad 34 for a trip three-fourths of the way around the earth.

It landed in the Western Pacific beneath a triple-parachute recovery system developed by Northrop Ventura.

The Apollo spacecraft command and service modules were produced by North American Aviation's Space and Information Systems Division, Downey, California, under contract to NASA's Manned Spacecraft Center, Houston, Texas.

The spacecraft contained all systems to be used in later manned missions with the exception of some elements of the environmental control system, crew couches and related equipment, since no astronauts were on board.

The spacecraft command module, which weighs about 11,500 pounds at launch and 9000 pounds at recovery, was the largest payload ever brought back from orbit by the United States and at the fastest reentry speed — 28,500 feet per second.

The punishing reentry maneuver was programmed to satisfy NASA's primary flight objective which is to evaluate the Apollo spacecraft heat protection system during one of the worst possible entry conditions that three astronauts might encounter returning from earth orbit missions. Successful completion of this 94-minute test qualified the Apollo for manned flight.

(See APOLLO, page 6)

HE BUILDS HIS OWN

Airline Strikes Don't Bother Thenhaus

The next time there's an airline strike, Ralph Thenhaus might be a good man to get to know.

Because Mr. Thenhaus, a construction engineer at Northrop Ventura, has built three airplanes in the past five years and is working on a fourth.

Mr. Thenhaus builds his planes entirely by hand, in a workshop added on to his Van Nuys home. His most recent completed project is a Thorp T-18, a 125-horse-

(See photos on page 6)

power single-engine two-seater which will cruise at nearly 150 miles an hour.

The T-18 took at least 2000 hours to build, figured at two hours every weekday, eight hours on Saturdays, and four on Sundays, for 21 months.

FIN TIP FOR T-38



Northrop Ventura's Coco Serna finishes up bonding details on a fin tip for the Northrop-built T-38 jet. Plastic Products has many responsibilities on both the F-5 and T-38,

as well as other Northrop aircraft. This is one of many program activities in the Division Plastics shop which are discussed in an article beginning on page 3.

NSL IS BUILDING SATELLITE TO STUDY SOLAR ACTIVITY

A new synchronous orbiting satellite, being built at Northrop Space Laboratories, will orbit the earth in a perfect circle at an altitude of 19,323 miles while gathering data on solar effects in deep space.

The satellite, named the OV2-5, is being manufactured on a \$981,000 contract from the U. S. Air Force's Office of Aerospace Research (OAR). The OV2-5 is the third such device developed and manufactured by Northrop for the USAF.

Northrop will design, develop and construct the new satellite and deliver it to Cape Kennedy by May of next year for proposed launching as a "bonus" payload atop a Titan III-C booster.

(See SATELLITE, page 6)

Norair Top Management Involved in Major Shifts

In a move designed to provide "the strongest possible deployment of our total management resources," Northrop's Senior Vice President — Technical Richard E. Horner, who has been serving double duty as Norair Division general manager, has returned to the corporate office to devote his full time and energy to his company-wide technical responsibilities.

Northrop President and Chairman Thomas V. Jones, in making the announcement earlier this month, said "the move was taken to strengthen the central planning and leadership of the research and engineering activities of the company."

At the same time, Mr. Jones announced that Welko E. Gasich, Norair vice president and assist-



Mr. Gasich

Mr. Horner

ant general manager — Technical, would move to the corporate office as a vice president, in order to devote himself to areas associated with corporate growth.

F. W. Lloyd was named corporate vice president and general manager at Norair, succeeding Mr. Horner. Mr. Lloyd has been with Northrop 25 years and for the past seven years has been assistant vice-president and general manager for Operations at Norair.

Roy P. Jackson, who has been manager of Northrop Space Laboratories, was named vice president and assistant general manager at Norair.

Four Division managers were elevated to vice presidents in the reorganization. They are: Milton Kuska, Engineering; Jack Mannion, Manufacturing and Material; Frank S. Perego, Marketing; and W. E. Woolwine, F-5/T-38 Program Management.

"Northrop has, in the fiscal year just ended, reported the highest backlog in its history," Mr. Jones said in the announcement. "All segments of our company have contributed to this growth. Continuation of this rate of growth into the future will demand the utmost effort of all of us and the strongest possible de-

(See MANAGEMENT, page 6)

Deceleration Experts Meet In Houston

The skirt jet, a lightweight retro-rocket system which would supplement parachute systems in bringing a space vehicle down to a soft landing, will be discussed in Houston next week by the Northrop Ventura man who invented it.

Edgar G. Ewing, principal engineer in Fluid Dynamics at Ventura, who invented the skirt jet, and George Frank, who performed development and testing, will be among four Northrop Ventura men taking part in the American Institute of Aeronautics and Astronautics (AIAA) Aerodynamic Deceleration Systems Conference in Houston. The Ventura group will present three papers at the September 7 through 9 meeting.

The conference, which will bring together deceleration systems experts from throughout the United States, also will include representatives from West Germany and England.

Ventura personnel participating, in addition to Mr. Ewing and Mr. Frank, will be:

John H. Moeller, supervisor of the Fluid Dynamics branch; Theodore W. Knacke, chief staff engineer; Phillip R. Delurgio, analytical engineer in the Fluid Dynamics branch, and Robert N. Worth, project manager in Planetary Landing Systems.

Mr. Frank will present the paper, "The Skirt Jet Impact and Attenuation System," at a September 7 meeting on Components and Tests.

The skirt jet, according to an abstract of the paper, meets the need "... for development of a lightweight terminal-impact attenuation system ... to supplement parachute descent systems. The skirt jet ... is designed to meet this need by making use of ground effect lift to augment the thrust of the rocket.

"The segmented tubular skirt jet retro-rocket is installed around (See AIAA, page 6)

1966 Picnic Expected To Attract 1500

An estimated 1500 persons — Northrop Ventura employees and their families — are expected to attend the annual Ventura employees' picnic, to be held Saturday, September 24.

The picnic, at Vasa Park in Agoura, will be sponsored by the Northrop Ventura Recreation Club. It will begin at 10:30 a.m. and continue until 5 p.m.

Johnnie Via, NVRC Council president, said a puppet show — among the finest in the country — has been scheduled for children's entertainment.

Clown acts, pony rides, a merry-go-round and other rides also will be included.

In addition, a registered nurse will be at the picnic throughout the day.

Hot dogs, hamburgers, soft drinks, popcorn and other snack items will be sold at the catered picnic.

FOR ROME, BH

International Names Executives

Northrop International this month announced the appointments of M. C. Johansen as senior marketing representative in Beverly Hills and Younger A. (Sonny) Pitts as regional director in Rome, Italy. Both men are retired U.S. Air Force colonels.

The appointments were announced by C. R. Gates, vice president-International.

Mr. Johansen's last military assignment was as deputy director of Operations for the 2nd Air Division in Vietnam.

During World War II he was with the 474th Fighter Group in Europe flying P-38 fighters.

After World War II he was with the F-80-equipped 49th Fighter Group in Japan, and the Fourth Fighter Group in the United States, which flew F-86's. He went to Korea with the latter organization.

In 1955 he was in charge of planning and developing the air defense system of Spain. He represented the United States in negotiating the accords un-



Mr. Johansen



Mr. Pitts

der which joint air defense was conducted in Spain, and the plan under which the Spanish Air Force would be trained and equipped for full operational readiness.

Mr. Johansen holds the Distinguished Flying Cross, the Bronze Star and the Air Medal with oak leaf clusters.

Mr. Pitts will be responsible for Northrop International's diversified activities in the Mediterranean area, and will report to the Northrop Paris office which supervises Northrop International operations in Europe, North Africa and the Middle East.

Charles Bradford Dies, Editor For Two Decades

One of Southern California's most distinguished industrial editors died August 20 in Hemet.

Funeral services were held August 23 for Charles Bradford, who edited the Northrop News for 22 years before suffering a serious illness in January 1965.

Services and interment were in Hemet, where Mr. Bradford had been recuperating.

He is survived by his widow, Martha, and a son, William.

Mr. Bradford joined Northrop in 1942. Just last month he was made a Life Member of the Southern California Industrial Editors Association, the highest honor that organization can bestow upon a member.

During his career he won 18 separate awards from the SCIEA for such accomplishments as feature writing, use of photography and newspaper

'Khartoum' Selected By Theatre Group

Northrop Recreation Clubs are combining to sponsor an all-Northrop theatre party September 17 for the 5 p.m. showing of "Khartoum" at the Pacific Cinerama Dome Theatre, Hollywood.

Regular \$2.75 loge seats will be available for \$2.35 and \$2.50 orchestra seats for \$2.15 through NRC sponsorship. All seats are reserved. Tickets may be obtained through Personnel Activities at each Northrop facility.

DIVIDEND DECLARED

The board of directors of Northrop has declared a quarterly dividend of 25 cents per share, payable September 17 to stock of record September 2.

layout. He also was frequently honored for editorial support of community service projects.

In 1951 he was president of the SCIEA and a vice president of the International Council of Industrial Editors. In 1955 he was named editor of the year by SCIEA.

In 1959 he received a public service award from California Governor Edmund G. Brown at the California State Fair and Exposition for a feature story. The Merchants and Manufacturers Association award was won by Mr. Bradford in 1957 for an unusually effective presentation of management's viewpoint on an important issue of the day.

He served a term as president of the Northrop Norair Management Club in 1953.

Mr. Pitts studied engineering at the University of Missouri and Centenary College in Louisiana, prior to entering the U.S. Military Academy at West Point from which he graduated with a bachelor of science degree in 1943.

He saw World War II service in the China-Burma-India theater, in squadron and group command positions.

After World War II he served in Panama, Germany and California as a jet fighter squadron commander. In 1955 he was appointed director of Airborne Weapons Programs at the Air Defense Command headquarters in Colorado Springs, Colorado, and subsequently commanded a fighter group in Portland, Oregon.

From 1960 until 1963, Mr. Pitts served in Oslo, Norway, as assistant chief of staff for air defense, Allied Forces Northern Europe, where he was an advisor to and represented the commander-in-chief, Allied Forces Northern Europe, in international planning for NATO.

Just before joining Northrop, Mr. Pitts was with the office of the Joint Chiefs of Staff in Washington, D.C., where he participated in operations and policy planning. This assignment took him to Vietnam, Thailand, and other Pacific areas. While in Vietnam he flew on operational missions against North Vietnam in conjunction with his responsibilities.

A command pilot, he holds the Silver Star, Distinguished Flying Cross with two oak leaf clusters, Legion of Merit, and the Air Medal with three oak leaf clusters.

Mr. Pitts is a graduate of the Armed Forces Staff College, the George Washington University Resources Management course, the National War College, and the George Washington University Graduate School of Political Science where, specializing in politico-military affairs, he was awarded a master's degree in International Relations.



Under-Secretary of the Air Force Norman S. Paul (left) presents an Air Force Cost Reduction Award to W. S. Kosidlak, Norair value engineer.

AUSA Invites Us To Disneyland Nite

The Association of the United States Army (AUSA) has invited all Northrop employees, their families and friends to join its members for an evening of fun at Disneyland, October 28.

Tickets at \$3.75 per person, will go on sale at all Northrop facilities September 6. The price includes admission to Disneyland and unlimited use of all Disneyland attractions. Children under three years will be admitted free.

Personnel Activities officials pointed out that only 1000 tickets are available to Northrop employees.

NO LABOR THIS DAY

All Northrop Corporation facilities will suspend operations Monday, September 5, in observance of Labor Day. Regular work shifts will resume Tuesday, September 6.

PRODUCT LICENSING

Another Invention From Acord's Garage

Another improvement has been incorporated on Northrop's F-5 jet fighter, with the addition of a newly designed miniature quick-disconnecting electrical connector.

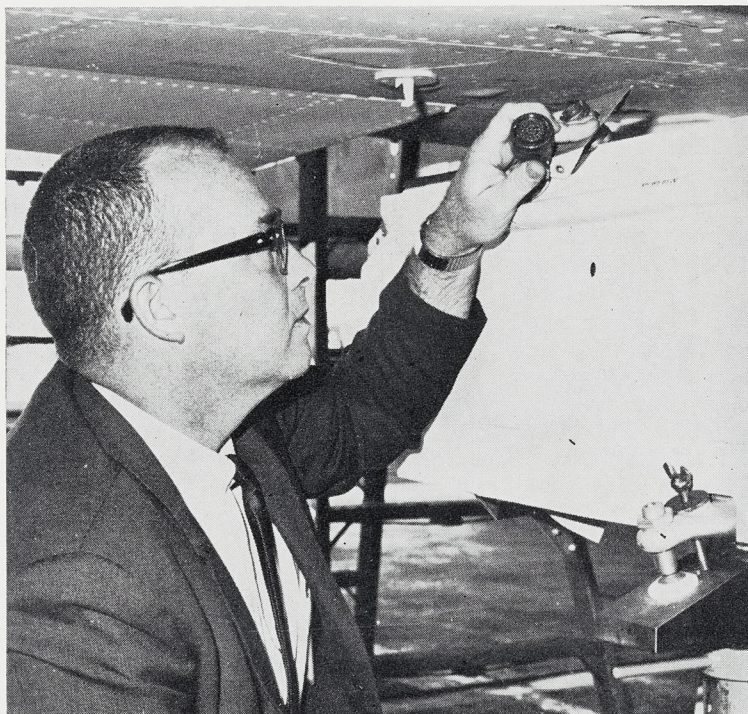
The connector, developed by Norair senior designer Jerry Acord, enables F-5 pilots to immediately jettison center line wing stores pylons when it becomes necessary to lighten the aircraft.

This means the F-5 is able to make a faster getaway in case of combat emergency.

The connector, Mr. Acord said, is one-third smaller than competitive designs, has only six parts, compared to 12 for earlier types, and weighs only 3.2 ounces. It also costs less to manufacture than other designs.

Mr. Acord decided to study possible improvements in earlier connectors, but found nothing on the market which he believed was satisfactory for the job.

So he engineered the new connector himself, in his garage, then borrowed a friend's lathe and built the first one by hand.



NEW CONNECTOR FOR THE F-5—Senior designer Jerry Acord of Northrop Norair examines the installation of a new type of electrical connector beneath the wing of an F-5. Mr. Acord designed the quick-disconnecting connector, one-third smaller than earlier types. The new design is being installed in all F-5's.

VALUE ENGINEER RECEIVES AWARD AT AF WORKSHOP

Ever think about the time required to paint insignia and letters on an airplane? A value engineering team headed by W. S. Kosidlak, a Northrop Corporation lead engineer did — and ended up saving the company more than \$38,000 a year in placing 250 markings on each T-38 Talon and 320 on each F-5 Freedom Fighter produced.

Mr. Kosidlak accepted an Air Force Cost Reduction Award for Northrop Norair August 17 at the International Hotel, site of this year's AF-Contractor Cost Reduction Workshop. The award was presented by the Honorable Under-Secretary of the Air Force Norman S. Paul.

Team members are: I. Van Velsir, value analyst; J. Ralston, process engineer; C. Wiedmann, design engineer; and R. Patterson, buyer.

For years stencils and silk screens had been used at the Norair Division to paint exterior markings (such as AF insignia, ID numbers and warnings) on production aircraft. Due to varied color and size of markings and letters required, several operations, with associated cleaning and drying periods, were necessary. The procedure was a time-consuming and thereby costly.

The new technique developed by the Norair Value Engineering team uses specially produced 3M Company Scotchcal markings which are processed in the marking shop. Production multicolor Scotchcal stock is selected, cut to size and packaged for appropriate F-5 or T-38 aircraft application.

Installation of aircraft markings now involves only removal of backing, application and edge sealing. This results in reduced man-hours required for the job. Additional savings are recognized from quantity production of the Mylar decals by the 3M Company.

He took his design to Stan Peterson in Corporate Licensing, and Norair granted a license for manufacturing the connector to AVDEL Incorporated of Burbank.

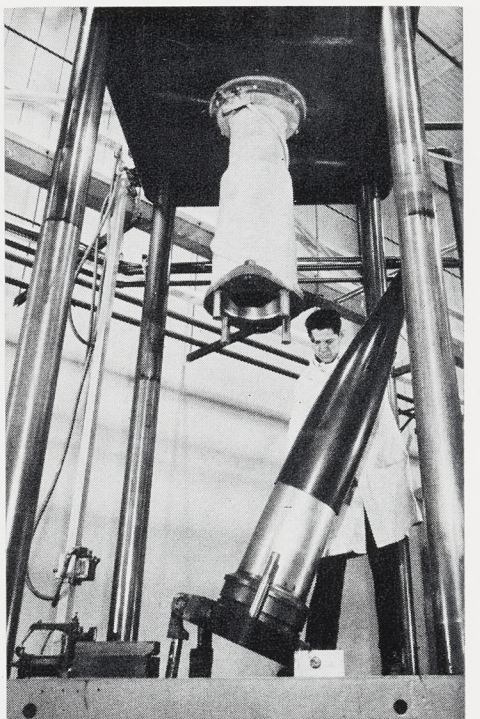
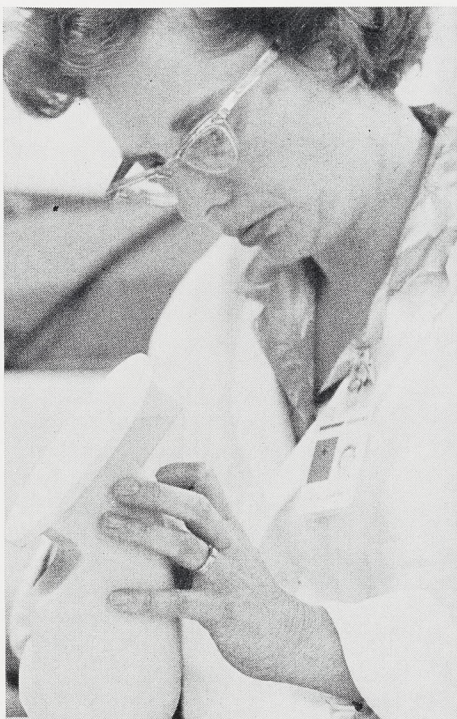
Under the licensing agreement, AVDEL began producing the aluminum-alloy connectors, and they are being installed on F-5 aircraft.

When the pilot decides to jettison the pylons, he presses a switch or button which initiates firing of the bolts, releasing the pylons. Gravity does the rest.

Mr. Acord, a 15-year man at Norair, has submitted 11 patent disclosures. Of these, Norair has licensed four; two on safety switches; two on switch actuators.

Mr. Acord, his wife and three children live in Lakewood. He joined Norair as a template maker and master layout man, and has been in Engineering for five years.

The new connectors will be adaptable to nearly all types of military aircraft, he said.



WORK UNDER 'TENSION'—Tension wrapping is a part of hand laminating work at Northrop Ventura Plastic Products branch. Here, Zelda Hampton (left) and Theda Thwing wrap cooling ducts.

A 'CURE' FOR PLASTIC—Joe Pavano (left) wheels a T-38 subassembly into a huge curing oven. At right, John Baldonado takes a completed RP-76 nose cone from a hydraulic press.

STUDY IN VERSATILITY

Plastics—From Drones to Big Jets

By JAY BERMAN—Northrop News Staff

Not too many years ago, the uses of plastics were limited — and the future growth of the plastics industry appeared to be equally limited.

In the past decade or so, however, all that has changed.

The automobile you drive undoubtedly has plastic or vinyl upholstery, interior trim and other parts.

Plastics in the packaging of food and household items has all but replaced many other packaging products.

And in industry, the technologies of plastics have more than kept up with the times.

At Northrop Ventura, the diversity of the Plastic Products branch covers the spectrum from the fabrication of minute subassemblies to large wing fairings for the Boeing 747.

Plastics in most consumer goods and in industry are not the same, although they are closely related. Most consumer-oriented plastic products are injection moldable grades of non-reinforced plastics, while plastics in the aircraft industry is centered around reinforced fiberglass.

There are many types of plastics, and many applications, and virtually all are utilized at Ventura.

Four basic types of work—vacuum forming, hand laminating, compression molding and foaming operations—are included.

Vacuum forming is just what the name indicates.

A vacuum is created by pumping the air from a mold, over which a heated sheet of Royalite plastic has been sealed.

As the air leaves the mold, the warmed plastic assumes the shape of the mold. After the part is formed, it is cooled and retains the shape of the mold.

Vacuum forming also is used in the building of some parts for Northrop's F-5 and T-38 planes.

Hand laminating, the process used to make cooling ducts for the F-5, involves the use of "pre-preg," glass cloth pre-impregnated with epoxy, polyester or phenolic resin systems.

The pre-impregnated glass cloth is laminated to the necessary thickness by hand after application of a vacuum bag, and then the material is cured in one of three large, gas-fired ovens in Plastic Products.

Much of the work is done by the 17-woman, 3-man laminating and fabricating group, headed by Supervisor Mary Gates.

Other Plastic Products supervisors are Ray Burdette, who has the Shift 2 operation, and Ray Escott, who has the press, trim and finishing section.

Laminated plastics have the advantage of high heat and electrical insulation, good machineability, wear resistance, and resistance to steam, oil, solvents, and corrosive atmosphere.

Compression molding is similar to metal stamping. Male and female molds have close fitting, and telescoping circumferential area to seal in resin and trim reinforcement. A mat (fiber batting) is positioned in the mold, a measured amount of resin is poured in, and the heated mold is closed under pressures sufficient to close the mold to the specified thickness.

Advantages of compression molding are:

Rapid production rates, good quality, excellent consistency, reproducibility and excellent surface finish.

The nose section, aft section, fairing, wings, horizontal and vertical stabilizers used on Ventura's RP-76 target drone are excellent examples of compression molding techniques at their best.

Foaming operations include the use of a hollow mold, a foam plastic in liquid form and a catalytic agent, to make the actual foaming take place.

(See PLASTICS, page 4)

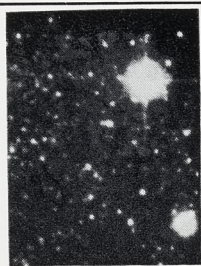


VERSATILITY AT WORK—Fred Howard (above) finishes an NV-105 tail assembly. John Jarose (below) pre-forms a honeycombed assembly on an aircraft duct lip. And below left, Hazel Johnson and Mary Goddard are busy with hand laminating operations.



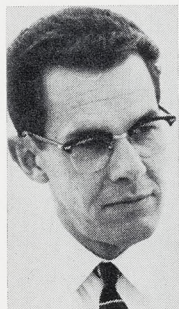
AD ASTRA PER ASPERA

Photo-Optical Engineers Honor Jack Gantz for ALOTS Work



The Society of Photo-Optical Instrumentation Engineers (SPIE) has conferred an honorary award upon Jack Gantz of Northrop Nortronics for his contributions to the development of the first optical tracking system used to record the launch and separation of spacecraft and missiles.

The award was made Aug. 24, at the annual SPIE convention at the Chase Park Plaza Hotel in St. Louis, Missouri.



Mr. Gantz

Mr. Gantz is project engineer for Northrop Nortronics' Airborne Lightweight Optical Tracking System (ALOTS), which was designed and built for the U. S. Air Force Eastern Test Range.

Mr. Gantz supervised and worked on all phases of development for the new tracking system.

ALOTS, which is installed on a KC-135 aircraft, is now operational at Cape Kennedy, and has recorded several Gemini launches and other missile shots.

Flying at an altitude of 40,000 feet, ALOTS provides above-the-weather, high resolution photographic trackings of space shots, and is giving space officials close-up views of critical staging separation operations.

The primary advantage of ALOTS over ground-based systems is its ability to perform under almost any weather condition. The altitude at which the aircraft flies puts ALOTS above 75 percent of the earth's atmosphere.

Mr. Gantz, a graduate aeronautical engineer from Cal-Aero Technical Institute, has also completed graduate studies in mechanical engineering at New York City College and the University of Southern California.

He joined Northrop Nortronics in 1959, and has almost 20 years experience in the design, development, production and management of pre-

cision optical-mechanical components.

Other projects with which Mr. Gantz has been associated include: development of long-range sun and earth sensors for the JPL Ranger and Mariner spacecrafts, design of the MMRBM star tracker, and the star tracker for the Navy's Compass Island.

Technical Information

Helping busy engineers and scientists locate and use technical information now available was the topic of two special presentations for Northrop Corporation personnel made recently.

The presentations are part of a User Orientation Program developed by the American Institute of Aeronautics and Astronautics in collaboration with NASA. Edward Ledeen of the AIAA headquarters staff made the presentations at Northrop Norair and Northrop Ventura.

Milt Kuska, Norair vice president—Engineering, and other top members of Technical management were briefed on the system recently and requested the presentation be made before key Northrop personnel.

Basically, the program is aimed at making the individual aware of the many products and services available in the field of technical information and how he may have access to this information through his own technical information center or library.

Included are information on journals, special publications, cumulative indexes and many types of NASA-conducted or sponsored research programs. There is also information on library and bibliographic services, microfiche, computer information retrieval and Selected Current Aerospace Notices (SCAN), NASA's new computer system for disseminating current information more quickly and efficiently.

Similar presentations are being made at other aerospace firms, NASA Centers, libraries and universities across the nation.

PLASTICS: Versatility in Products, Craftsmanship and Technology

(Continued from page 3)

The newest — and possibly largest — operation in Plastic Products is the Boeing 747 contract.

Under terms of the letter contract, Plastic Products will build wing fairings and cab fairings for the huge jet.

The honeycombed and reinforced fiberglass wing fairings will fit at the junction of the wing to the fuselage. The cab fairings, made of the same material, will sit atop the airplane, directly behind the pilot's cabin.

Tentative plans call for the cab fairings to be delivered to Boeing in Renton, Washington, between December 1967 and September 1971.

Wing fairings are scheduled for delivery between May 1968 and March 1972.

Both will be shipped directly to Renton from Ventura.

Designs are being prepared for both types of fairings. A team of 17 Ventura engineers is in Renton, making plans for the 22-section wing fairing and six-section cab fairing.

Design on the wing pieces is scheduled to continue through February. The same work on the cab fairings is scheduled to be completed next May.

Final detailing work will be completed in Ventura. After that, the project will be turned over to Plastic Products, for fabrication.

Harry McLaughlin is foreman of Plastic Products. Personnel lists in his branch show 65 workers, up from 40 only three months ago.

In anticipation of future work, Mr. McLaughlin said:

"We are increasing our plastics oven-curing capability by

at least 100 percent, and creating a capability for manufacturing larger parts."

The more that Plastic Products is called upon, the happier Mr. McLaughlin is.

"The more new methods and processes we get, the better we like it," he said.

"We like the challenge of new products. You need new operations in plastics from time to time so that things don't get too static."



Carl D. Cleeton became Northrop Norair's 81st candidate for membership in the Wise Owl Club after an accident in which safety glasses prevented possible loss of eyesight. Mr. Cleeton was removing broken drill bit from assembly, his pliers slipped and broke his safety glasses, but no injury was sustained.

'YELLOW PERIL' STRIKES PILOT ON BOMB RUN

The *Stars and Stripes* reported this month an unusual attack on an F-5 fighter pilot during a combat mission in Vietnam with the 10th Fighter Commando Squadron.

Pilot Jim Martin was on the second bombing run of his 16th mission when he felt a thump and looked down. There, slithering like a snake from under his seat pad, was this yellow thing.

It started to wrap itself around his leg, then changed its mind and went for the controls.

The one-man inflatable life raft in his seat survival pack had inflated itself automatically and crawled out into the cockpit with the pilot.

First it jammed the control stick hard over to the right, sending the supersonic jet into a corkscrew spin. Then it blocked off the pedals, cutting the pilot off from the controls. The raft blocked his hand from reaching the radio button.

But as the jet corkscrewed, wind pressure on the wings slowed it down enough to allow the pilot to reach the survival knife sheathed on his G-suit. Slashing, thrashing and thrusting, he finally hit a vital spot. The raft shuddered, collapsed and died.

Pilot Martin rejoined his wingmen and finished the mission with several strafing runs.

Mobile Training Unit on Tour For F-5 Classes

A Northrop-built F-5-109 Mobile Training Unit (MTU), accepted this month by the Air Force's Training Command (ATC), is destined to become a world traveler.

It will be utilized by a special ATC Instructor Team for conducting F-5 training classes anywhere in the world a requirement is established.

Eight other Northrop MTU units are currently in use for this purpose, one at Williams Air Force Base, Arizona, the remainder in allied nations that have received the F-5 as part of their defense force.

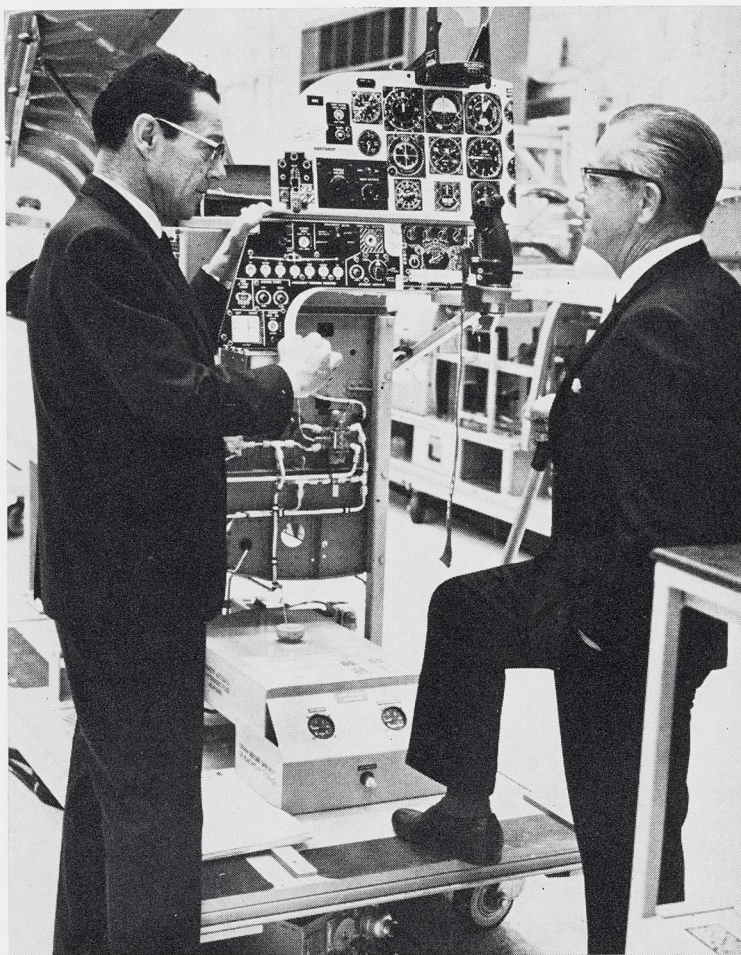
Each MTU is an ingenious assortment of 14 individual trainers, two equipment groups of related support equipment and a set of approximately 800 technical training transparencies or slides. The combined MTU is lightweight, compact, transportable by air and entirely mobile on the ground. It contains its own power equipment, aerospace ground equipment and technical orders.

When operated by special Instructor Teams, the MTU is an ideal means for teaching aircrew and maintenance personnel exactly how each F-5 component and system works and its relationship to all other systems. Trainees may actually operate the system under simulated field conditions, over and over again, if necessary,

until they are minutely familiar with each movement and action.

Normally, aircrew and main-

tenance personnel receive their first training on the F-5 on the MTU located at Williams Air Force Base.



WORLD TRAVELER—Harry Blocher (left) of Product Support and Rex Thornhill of Advanced Production chat beside Northrop F-5-109 Mobile Training Unit, designed for ATC use around the world.

A graphic example of the use of the F-5 MTU is evidenced in the more than 1200 students from many nations—Ethiopia, Greece, Iran, Korea, Norway, The Philippines, Taiwan, Thailand, Turkey, Canada and the United States—who have been trained in F-5 maintenance work there.

Instructors for these courses have been an ATC Instructor Team. Two other teams have traveled around the world assisting nations obtaining their own MTU systems. These two teams have assisted the returning cadre, graduates of the Williams training, in setting up their own training programs.

Two organizations at Northrop Norair are responsible for the design and fabrication of F-5 MTUs—Customer Training of the Product Support department and Advanced Production of Manufacturing. Direct responsibility falls to Harry Blocher and Rex Thornhill respectively.

Since 1952 this design-production team has turned out 19 sets of MTU and performed six other modifications of MTU. They were developed for support of the F-89 interceptor, the Snark missile, the T-38 trainer and the F-5 fighter. They represented a total of 400 system trainers and 8600 training transparencies.

Classified

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private business are not accepted. The Northrop News reserves the right to edit or omit ads. Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

For Sale

Couches, 2, 7', custom-made, all down, \$900. Beverly Hills, TR 6-6416. A

Dining Room Set, 12 chairs, 3 leaves, other antiques, \$850. Box 1701. A

Corvette, 1962, radio, 4-sp. positr., comp. clutch & suspension, removable h/top, 327 cu. in., avail. 1st week in Oct., \$1875. Gardena, 532-5086. A

Carburetor, C series A.F.B., fits Ford 272-312 manifold, \$15. Hawthorne, OS 9-6215. A

Organ, Hammond M-3 spinet w/percussion, unmarred maple finish, \$795. San Pedro, 831-5837. A

Sofa Bed & matching living room chair, pink, \$75. Redondo Bch., 374-1124. A

Couch, beige frieze, chair, \$40. L.A., PL 5-1925. A

Triumph, 1962, TR3, \$1175. Calabasas, 889-9495. A

House, near Northrop, 2-bdrm. & paneled den w/fireplace, alum. siding, det. 2-car garage, 10% down, \$23,500. Inglewood, 676-2958. A

Tent Trailer, Sears "Ted Williams" camper model, used 4 times, provides 7'x12' tent, dble. bed, storage, includes extra ground tarpaulins, \$300. Rolling Hills Estates, DA 6-1420. A

Ford, 1956, 4-dr., rebilt. trans. & carb., \$100. L.A., PL 4-1628. A

House, 3-bdrm., 2-bath, dble. gar., large fam. rm., about 5 yrs. old & 20-25 min. from Northrop, existing 5 1/4% loan for \$18,500, owner will take 2nd on part of balance, \$24,000. Wilmington, 830-0740. A

Enlarger, prof., 5x7 Elwood, 8x10 Studio View camera, 12" lens, 9' sink, 20x24 stainless steel trays (cust. made), extra darkroom access., other cameras, \$1000. Hermosa Bch., FR 9-7342. A

Home, 3 years old, 3-bdrm., 2-baths, fam. room, large lot, block wall & patio, near schools, park & shops, \$25,750. Torrance, 834-4948. A

Honda, 1965, 250 Scrambler, 25mm jets, \$500. Inglewood, 676-8982. A

Sofa & Chair, Hollywood, re-upholstered, 4 mo. ago, \$50. Redondo Bch., 371-9724. A

Motorcycle, Bultaco Mercurio 1965, 175 cc, chrome tool box, \$450. Inglewood, PL 6-7681. A

Golf Clubs, 8 irons, Wilson, reg. prof., matched set, 2 thru 9, \$16. Inglewood, OS 9-5731. A

Lamp, fluorescent drafting, light green, 15" arms, \$15. Hawthorne, 644-1958. A

Volvo, 1963, 2-dr., one owner, \$1350. South Gate, LO 6-1226. A

Ford, 1962, T-Bird, new tires, brakes, paint, full pwr. & air, \$1525. L.A., 645-5610. A

Mountain Cabin, Idyllwild, 3-bdrm., den, sewing rm., 1 1/2-bath, elec. kitchen, fireplace, gas, heat, 100x150 lot, \$17,200 loan, low dn., \$19,300, Anaheim, 714-535-6712. A

Chest, early Amer., 7-dwr., & satin vinyl king bed head, \$50 ea., Palos Verdes, 378-8181. A

Breakfront, French prov., & server fruitwood, \$150 or will sell sep. Huntington Bch., 714-892-5018. A

Volkswagen, 1964, low mileage, \$1250. Garden Grove, 714-530-1237. A

Home, 2-bdrm., walk to Northrop, R-3 w/comm. pot., GI appraisal \$16,300, \$15,500. L.A., 754-4098. A

Radio, Heathkit DX100, phone & cw. transmitter, \$69. Hawthorne, OS 6-6949. A

Chevrolet, 1961, Impala, V8, stick, 2-dr. h/top, \$900. Santa Susana, 805-527-1621. A

Front end, fiberglass, w/bubble, tilt kit, & tow bar for 1957 Ford & other auto parts, \$255. Rolling Hills, FR 7-3487. A

Mercury, 1955, 2-dr. h/top, air, p/b, new tires, \$200. Hawthorne, 644-3263. A

House, 50x135 lot, landscaped, blockfenced yrd., dble. gar., built-in range & oven, forced air heat, fireplace, \$24,000. Torrance, 328-3512. A

Studio Couch, maple, \$70. Hawthorne, OS 6-3410. A

Camper, Gem Top (cab high) for '61-'65 Rancher pickup, louvered windows, \$80. Torrance, FR 1-1096. A

Motorcycle, 1964 Triumph, 650cc, \$800. Inglewood, 674-1847. A

Condominium, 4-bdrm., 2 1/2-bath, bltins, incl. stove, d/washer, washer, dryer, garb. disp., screened in patio, pool & rec. bldg. accessible, pets, children welcome, schools nearby, shop walking dist., \$24,950, terms. Anaheim, 714-635-1686. A

Knitting Machine, \$20. Gardena, 329-5369. A

Ford, Coupe, 1948, 3rd owner, orig. paint, 1963 Chev eng., new int., over \$1600 invested, \$1000, Torrance. FR 8-1350. A

Encyclopedia, Collier's, 24-Vol. & Jr. Classics, w/Bibliograph Index and yearbooks to 1965, \$275. Inglewood, 671-5242. A

House Trailer, 30-ft., bathrm., shower, etc., fully furnished, \$500. Inglewood, 674-1885. A

For Sale

Ford, 1961, 2-dr., 2-tone Cruiso, 390 cu. in. T-Bird eng., new brks., good tires, spot lite, \$535. Rolling Hills Ests., FR 7-3744. A

Dining Room Table, w/6 chairs, 2 w/arms, chair cushion incl., \$169. Wilmington, 371-3257. A

House, 4-bdrm., 1 1/4-bath, f/place, unusual kitchen, dishwasher, garb. disp., bltins, fenced yard, landscaped, 3 1/2 yrs. old, \$26,000. Torrance, 834-2175. A

Living rm. outfit, maple bdrm. set, kitch. set, end tables, coffee table, take over pymts. of \$18.11 or \$300 complete. Fullerton, 714-879-5697. A

MGA, 1960, 1600, needs body work, \$500. Harbor City, 325-5705. A

Heathkit, HA-20, 6-meter linear amp., push-pull 6146 final amps. 125 watts, \$80. Lakewood, 865-7893. A

House Trailer, Stewart Coach, 38'x8', eastern-bit., fully furn., incl. full bath, refrig., butane stove, \$995. Hermosa Bch., 374-3638. A

Sailboat, fiberglass, 8'4", dink kitten racing class, black hull, white int., good woodwork, \$200. Hawthorne, 675-6282. A

High Chair & play pen w/pad, ea. has tublr. met. frame & is folding type, \$25. Santa Monica, EX 4-8641. A

Home, 3-bdrm., 1 1/4-bath, fenced, landscaped w/sprinklers, fireplace, ash paneling, kitchen w/bltins., \$31,000, or will lease \$250 mo. Palos Verdes, FR 8-5475. A

Motorcycle, Glera, 1965, 202 cc, 4-cycle, 90 m.p.g., \$325. Manhattan Bch., 376-6790. A

M.G.-T.D., 1953, recently rbilt., many spare parts, shop manual, \$600. Anaheim, 714-774-2897. A

TV, 21" RCA, Victorian cab., new cost \$400, \$35. Marina Del Rey, 675-2642. A

Pups, German shepherd, 6 wks. old, p/bred, black & tan, \$35. L.A., 645-4697. A

Coins, hand-picked choice 1941-'65 Lincoln sets in Whitman folders, \$3.50, also Lincoln rolls, most years. Torrance, DA 6-5558. A

Condominium Home, 3-bdrm., 2 1/2-bath, intercom., f/place, bltins, pool clubhouse, \$3900 equity for \$1300 bal. \$24,700. Torrance, DA 7-2831. A

Ham Equipment, transmitter, 150 watt Vefo. controlled & crystal, night T150 80 - 6 meters, receiver, National 270, 80-6m, \$300. Torrance, 325-8212. A

Oil Painting, 23x36, blue & white winter theme, in blue & gold frame, \$50. Torrance, 371-9925. A

Accordion, full size, \$150. L.A., 277-2549. A

Camera, Rolleiflex, f/2.8 2 1/4"x2 1/4", flash-flex capacitor, flashgun bayonet, flash bulbs, lens shade filter holder, 6 filters, 1 holder, fitted case, G.E. light meter, leather carry-all bag, \$85. San Pedro, FR 2-6585. A

Contour Chair, \$10. Hawthorne, 676-7109. A

Diving equipment, full wet suit, size 40, depth gage, compass, tank & harness, \$85. Manhattan Bch., FR 9-6931. A

Infant seat, \$1. Inglewood, 674-6395. A

Auto, r/h, p/b, p/s, auto. trans., never o/hailed, \$500. Hawthorne, OS 9-7123. A

Pontiac, 1963, Bonneville convt., fact. air, full power, AM-FM, \$1750. Hawthorne, 675-5765. A

House, 4-bdrm., fam. room, 2 1/2 baths, 1 acre, horses OK, near Northrop Ventura, \$35,000. Somis, 805-482-1186. A

Pontiac, 1966, Tempest, 8-cyl., auto. trans., r/h, \$500 & take over \$16 weekly pymnts. Lawndale, 370-3821. A

Hi-Fi, table model radio-phonograph, \$39. Hawthorne, 676-0418. A

Wet Suit, complete, size 5'8", 145 lbs., \$35. Redondo Bch., 371-0323. A

Yamaha, 1963, 250cc, YDS2, dirt racer, new pistons & lower end, \$350. Torrance, FR 5-2169. A

Redwood Fencing, w/door, approx. 100', 5' high, \$15. San Pedro, TE 3-2512. A

Datsun station wagon, 1965, 4-dr., 14,000 miles, \$1350. Inglewood, 675-8173. A

Sailboat, 10' fiberglass complete w/dacron sail & trailer, \$250. Long Bch., GA 7-4197. A

Guitar, Gibson & Les Paul & bass amp., 1964, \$300. Lawndale, 370-9440. A

House, 3-bdrm., bltins, bltin TV/Hi-Fi area, raised fireplace, 500 sq. ft. playrm.-workshop, 2 1/2 car gar., fruit trees, walking dist. to shops, 10% dn., \$25,000. Alhambra, AT 4-5698. A

Pin Ball Machine, fully automatic, full size Shindig, operated by coin or auto. switch, \$60. Torrance, 375-6467. A

Extension Table, solid maple, w/leaves & pads, \$40. P.V. Pen., FR 7-5408. A

Crib & Mattress, wood, retractable sides, \$5. Torrance, 325-0039. A

Couch, 8', tweed, provincial style, \$45. Torrance, 326-1997. A

Marker Generator, Simpson, oscilloscope & sweep frequency oscillator, all combined into model Genescope, accurate to .05%, \$150. Buena Pk., UN 3-2769. A

Coat, mink, full length, autumn haze, 10 yrs. old, 9 yrs. in cold storage, appraised at \$700, \$500. P.V. Pen., FR 8-1863. A

Cemetery Plots, 2, Inglewood, Greenlawn section, adjoining, \$350 ea. Hawthorne, OS 6-8842. A

Vacation Trailer, special collapsible design, sleep 4, lightweight, welded all steel frame & sides, 6'x10' size, Aerol alum. wheels, hitch & 4 polyfoam mattresses, \$125. Inglewood, 757-2955. A

Refrigerator-Freezer, Admiral, \$15. Torrance, FR 8-0500. A

Rifle, M-1 Winchester, \$75. Anaheim, 714-828-5759. A

Bedsprads, hand crochet, \$35. Box 1702. A

For Sale

Chevrolet, 1950 convt., \$75. Box 1703. A

House, 7 yrs. old, 3-bdrm., 6' blk. wall, 1/4 blk. to grade school, \$1697 dn. to old F.H.A. \$16,790 bal. Lakewood, 865-8009. A

Home, 1 yr. old, fully landscaped, 5-bdrm., family rm., 1/2-acre horse lot, \$3500 dn., balance at 6 1/4% interest pymnts. of \$295 mo., \$49,750. Box 1704. A

Malibu, 1965, s.s., 327 engine, 10,000 miles, \$2400. Hawthorne, 675-1987. A

Supercharger, Judson, for 1963 VW, all parts & instructions, \$185. Lomita, 326-0221. A

Volkswagen, 1964, radio w/rear speaker, new tires, new Porsche clutch, eng. trunk lock, \$1350. Redondo Bch., 375-9648. A

Jeep station wagon, 2-wheel drive with o/drive, 1952 model, rbilt. eng., 400 miles, rebilt. trans., rebushed front end, \$250. Box 1705. A

Baby Furniture, crib, mattress, mesh playpen, stroller, car seat, hi-chair, jumper, infant seat, \$50. Manhattan Bch., FR 4-4780. A

Home, 5-bdrm., 3 1/2 bath, on view lot, convenient to Nor. Anaheim, \$77,000. W. Covina, 339-8008. A

Ford, 1965, Galaxie 500 convt., low mileage, \$2200. L.A., PL 6-2587. A

Volkswagen, 1600 TL fastback, 290 miles, \$2150. Anaheim, 714-828-3718. A

Corvair, 1961, good mechanical cond., new tires, \$350. Box 1706. A

Chevrolet, 1962, Impala ss convt., good tires & eng., \$1100. Torrance, 375-0165. A

Honda, CB 160, new tires, chain & battery, Barnett clutch, \$375. P.V. Ests., 377-2065. A

Mercury, 1951, o/drive, rebilt. eng. & carb., \$99. La Mirada, WH 1-5549. A

Motorcycle, 1965, Harley Davidson M-50, 50cc, 2700 miles, orig. owner, \$150. Culver City, 398-3949. A

Cemetery Lot, single, Parkview, Inglewood Park, \$550. Torrance, TE 5-2128. A

Movie Camera, Kodak 8mm, light bar & case, \$25. Fullerton, 525-7685. A

House, 3-bdrm., 1 1/2 bath, den w/fireplace, newly painted, dtch. dble. garage, sprinklers, 2 blocks to elem. school, low dn. pymt., \$26,000. Inglewood OS 5-5592. A

Wanted to Buy

Volkswagen, sedan, 1963 or older, good cond. Torrance, DA 3-2144. B

Power Edger. Inglewood, 679-9891. B

Luggage in good condition, man or woman's at least 3 pieces. Box 1707. B

Honda, 50cc, take over payments. Torrance, DA 4-8663. B

Trail Bike, in good condition. La Mirada, 714-521-1516. B

FREE (To Be Given Away)

Puppies, all black, part cocker spaniel & poodle, female. Lawndale, OS 5-9695. D

Kittens, 4, born July 13, black, grey & calico. Torrance, 830-2380. D

Rentals Offered

Apt, 2-bdrm., bltins, thermo heat, garb. disp., child's play area, carport, newly dec., prefer 2 small children, trash & water free, \$100. Torrance, 320-2827. E

Apt, 1-bdrm. unfurn., f/place, 1/2 block to ocean, stove & ref. incl., closed gar., adults, \$135. Redondo Bch., FR 8-7905. E

Vacation Cottages, Idyllwild, 1 & 2 bdms., secluded, stream, patios, \$20-\$35 w/ends, \$45-\$65 wk. L.A., PL 4-5288. E

Apt, 1-bdrm., furn., mod., walking dist. to Northrop, \$90. Hawthorne, OS 6-4734. E

Apt, 1-bdrm., bltin stove, closed gar., laundry facil., \$89. Torrance, 328-6955. E

Apt, 2-bdrm., 2-bath, priv. balcony, d/wash., air cond., sound proof., fenced yrd., subter. gar., \$155 mo. Inglewood, FR 5-0867. E

Apt, 1-bdrm., bltins., disp., furn., \$115; unfurn., \$100. Hawthorne, 675-9540, 675-9535. E

Apt, 2 bdrm., 2 blks. from Norair, water, trash pd., bltins, disp., laundry facil., \$115. Hawthorne, 675-3771 or 675-8388. E

Apt, 1-bdrm., unfurn./furn., bltins., air-cond., 20 min. to Norair, \$95/\$105. Mar Vista, 391-7781. E

House, 2-bdrm., furn., alone on lot, adults, no pets, avail. Sept. 15, \$97.50. Inglewood, 677-4347. E

Cabin, Big Bear Lake, mod., sleeps 7 to 9, \$18 w/end; \$50 week. Bellflower, TO 7-0662. E

Unit, 2-bdrm., on waterfront, Huntington Harbor, 46' boat slip, gar., year lease, \$300. Orange, 714-637-8648. E

Vacation Cabins, Lake Gregory & Crestline, \$25 w/ends, \$60 wk. Venice, EX 1-2040. E

Roommate to share 2-bdrm. bachelor apt., lge. furn., swimming pool, 3 1/2 blocks from Nortonics Hawthorne, \$70 mo. Gardena, 321-0928. E

Cabin, Green Valley Lake, \$35 w/end, \$60 wk. Torrance, 320-2002. E

Apt, 1-bdrm., pool, bltins, \$95. Redondo Bch., 376-2117. E

House, furn., 2-bdrm. & den, 1 1/4 bath, 2-car gar., near freeways, \$225 mo. Gardena, 329-6753. E

Personals

My Son & I wish to thank each & everyone at Northrop for the flowers, cards, donations to various charities & personal letters in my husband's memory. We thank you. MRS. CHARLES BRADFORD. L

We wish to express our thanks & sincere appreciation to our many friends at Northrop for their kindness & remembrances during our hospital stay & recovery period from our auto accident. Also, thanks to NRC for the beautiful chrysanthemums & to the Gem & Mineral Society for the lovely planter. VARNEY BANCROFT & FAMILY. L

NOW, WHO COULD THIS BE?



Farmer Gates has a word with The Drunkard's daughter, Julia, in musical version of the play, "The Drunkard," now featured at the Golden Hull Restaurant-Theatre in Redondo Beach. Julia is portrayed by Joanie Cahn, talented daughter of Norair Engineer Mickey Cahn. She helped her father, who is an accomplished musician himself, land role as Farmer Gates. "Mad Agnes" (at left) is not a Northrop employee.

From Clerk Typist to Student In Greece in a Week's Time

Laurie Warner is a clerk typist at Northrop Norair this summer, but in less than a week she'll be a college student in Europe.



Miss Warner school year.

The girls will enroll on September 16 at Pierce College, a small English-language school in Athens.

For the past two years, Miss Warner attended Lewis and Clark College in Portland, Oregon, and it was her performance there which made the European trip possible.

"My parents told me they'd

For Sale or Trade

Trailer, 18', w/refrig. & stove, \$150 or trade for hauling trailer. Hawthorne, 644-1205. M

House, 4-bdrm., fam. rm., 2 baths, fenced & landscaped yd., 1 mile to Research Park, 5 1/2% loan, \$39,990 or trade for house from Inglewood area. P.V., 377-5172. M

Going my way?

Rides Wanted

7:24 a.m. — 4:06 p.m.
Anaheim & Figueroa via Harbor Fwy. Tom Henrich, Mariposa, ext. 2425, TE 5-9070. 1

7 a.m. — 3:42 p.m.
Chapman St. or near City of Orange, Orange. Larry Slininger, Norair, ext. 2105, 2106. 2

8 a.m. — 4:42 p.m.
Acacia Ave. & Broadway, Hawthorne, E. M. Martin, Norair, ext. 1611, 679-4211. 5

Diamond Bar to Anaheim, Diamond Bar. Craig E. Wilson, Nor. Anaheim, ext. 1195, 595-7740. 5

Vicinity of Garden Grove, Garden Grove. Wm. Woodroof, Norair, ext. 1715, 530-3242. 5

Golden West & San Diego Fwy., Huntington Beach. Dennis Talbott, NSL, ext. 1104, 842-7052. 5

Rides Offered
7 a.m. — 3:42 p.m.
Slauson & Atlantic, Maywood. Velma Porter, Norair, ext. 1284, LU 2-1079. 12

8 a.m. — 4:42 p.m.
Golden West & San Diego Fwy., Huntington Beach. Dennis Talbott, NSL, ext. 1104, 842-7052. 15

Vicinity of Garden Grove, Garden Grove. Wm. Woodroof, Norair, ext. 1715, 530-3242. 15

let me go to school any place in the world as long as I kept my grades up," Miss Warner said, "and I have a B average." Her father is Don Warner, Norair manager of Research and Development.

Miss Warner and one of the girls will stop in Glasgow, Scotland, where they'll visit friends of the other girl. Then, in Copenhagen, Denmark, they'll visit Greg Larnes, who was an exchange student at Palos Verdes High School last year. While in the United States, he lived in the Warner home and went to school with Miss Warner's brother.

"We plan to travel through Europe during the school year," Miss Warner said. "We won't have a car, but train travel in Europe is inexpensive. I especially want to see Switzerland, Austria and Spain."

Students at Pierce College have two-week vacations both at Christmas and Easter. That's when the girls plan to do most of their European sightseeing.

Miss Warner spent the summer working in several positions, the most recent as secretary in Ken Yost's area. He is chief of Technical Data Administration.

Two Tooling Men Pocket Cash For Cost Cutting Ideas

Two members of the Northrop Norair Tool Design and Fabrication function recently converted good ideas into ready cash through the Suggestion Award Plan, receiving their outstanding payments on the same day.

For Glenn S. Crayk the payment was \$480. Marvin F. Kratz received \$471.

Mr. Crayk proposed removable leader pins be used for Verson dies. This enabled the blanking of larger sheets of raw material and afforded greater versatility in the nesting or locating of parts on the materials.

Mr. Kratz came up with a better method of pouring epoxy in the making of master tooling.

SIX WEEKS GIVEN TO PLAN OFFRAMP CONSTRUCTION JOB

Construction may begin within six weeks on an offramp on the north side of the Ventura Freeway, near Northrop Ventura.

A Ventura firm, El Rio Construction, tentatively received the contract on August 18 when its bid of \$268,931.02 was accepted as the lowest by the State Department of Highways.

It was one of four bids received for the job, which includes construction of the offramp from the freeway onto Borchard Road and Rancho Conejo Boulevard.

Under the terms of the contract, the firm will have approximately six weeks to prepare for the job, then 105 working days to complete it.

It has been expected that construction wouldn't be under way until November.

The offramp, when completed, will permit westbound traffic to leave the freeway and go north onto Rancho Conejo Boulevard without having to cross over from the west.

Now, the one westbound off-ramp has a 180-degree turn, doubling back to Rancho Conejo Boulevard.

SATELLITE

(Continued from page 1)

William C. Armstrong, Northrop program manager for the OV2-5, said the principal difference in the OV2-5, compared to its forerunners, is its more sophisticated data system.

Because of the increased electronic payload, the OV2-5 will weigh approximately 25 to 50 pounds more than its predecessor, the 400-pound OV2-3. The OV2-1 weighed about 360 pounds. The new satellite will be approximately seven feet high and four feet square which is about the same size as the previous OV2 vehicles.

Fabrication has begun at NSL on operating models for thermal, harness, integration systems analysis and antenna tests.

Cost reduction will be accomplished by the use of several compatible subsystems developed for the OV2-1 and OV2-3, Northrop program officials said.

Through the use of solar panels, the OV2-5 is expected to gather vital environmental data and perform experiments on solar effects in space. Northrop Space Laboratories personnel will also train USAF officers to monitor the satellite.



DECELERATIONS EXPERTS—Three of these men will represent Northrop Ventura next week at a meeting of deceleration systems experts in Houston. Theodore Knacke (seated, right) will be chairman of one session. John H. Moeller (standing, left) will present one paper, and Phillip R. DeLurgio (standing, right) will present another. Edgar G. Ewing (seated, left) and Robert N. Worth (standing, center) are co-authors on two of the papers. Also making the trip will be George Frank, not present when the picture was taken.

APOLLO: Second Unmanned Flight From Cape Kennedy Is Successful

(Continued from page 1)

The trajectory during first stage powered flight approximated a normal profile for insertion into earth orbit. The second stage powered boost and subsequent service propulsion engine firings were tailored to provide maximum high heat load conditions during the command module's entry.

The spacecraft command module slammed into the atmosphere about 79 miles (400,000 feet) above Australia while traveling about 19,451 miles an hour. The Avco-produced ablative heat shield glowed as it developed a peak temperature of 2700 degrees Fahrenheit—hotter than molten lava—during its descent to a height of about 41 miles (218,000 feet).

Annual Venison Feast Due September 17

Members of the Northrop Ventura Rod and Gun Club will hold their fourth annual venison dinner on September 17, club commissioner Dorothy Prychoda has announced.

The dinner, open to all Ventura employees and their families, will begin at 8 p.m. at Chatsworth Center, 10332 Santa Susana Blvd., Chatsworth.

Venison and barbecued beef will be served, and will be prepared by club members, Mrs. Prychoda said.

Tickets may be obtained by contacting Mrs. Prychoda, extension 264; Earl Muehlenbach, extension 266; Joyce Nelson, extension 377; or Fred Matheson, extension 507.

At this point the command module, roller-coaster style, climbed back up to about 50 miles (about 265,000 feet). Then, it began its descent for parachute recovery in the Pacific Ocean near Wake Island.

It landed 200 miles from the USS Hornet, the prime recovery ship.

The first Apollo crew—astronauts Virgil I. Grissom, Edward H. White and Roger B. Chaffee—watched the launch.

MANAGEMENT

(Continued from page 1)

ployment of our total management resources."

Mr. Horner joined Northrop in July 1960, after serving for more than a year as associate administrator of the National Aeronautics and Space Administration.

He was responsible for the operational management of the research and development program for NASA.

Before joining NASA, he spent more than three years as assistant secretary of the Air Force, specializing in research and development.

Mr. Horner received a bachelor of science degree in aeronautical engineering from the University of Minnesota in 1940. He then joined the United States Army Air Corps as a second lieutenant.

In 1949, he left the Air Force as a colonel.

He and his wife, Margaret, have two children.

AIAA: Deceleration Systems Experts Meet in Houston

(Continued from page 1)

the outer periphery of the vehicle bottom. In this configuration, the jet curtain generated by the retro-rocket captures and holds a gas cushion under the vehicle.

"... tests with an 1100-pound simulated capsule have demonstrated that the decelerating thrust of the annular retro-rocket is increased 50 to 90 percent.

Mr. Moeller will present his paper, "A Method of Load Prediction for Parachutes in Cluster," at a September 7 meeting on Fundamentals.

"Individual parachutes operating in cluster generally do not provide identical performance during the deployment and inflation sequence," Mr. Moeller's paper says.

"... a method is presented for predicting individual parachute peak loads when operating in cluster, using opening shock factors.

"... data are presented from drop tests of two- and three-parachute clusters, as well as single parachute tests. The general method of peak load prediction is independent of the type of parachute employed."

Mr. Delurgio will present the paper which he co-authored with Mr. Worth on "Parametric Analysis of Parachute Landing Systems for Planetary Missions," in a September 8 meeting on Systems. Chairman of the session will be Mr. Knacke.

In part, the abstract of their paper reads:

"... Interim results of investigations with the Voyager Mars landing system problems arising from (1) the requirement for sterilization, (2) operation in atmospheric conditions comparable to an earth altitude comparable to 140,000 feet with (3) postulated surface winds of 200 feet per second and (4) the requirement for initiating deployment in an unknown atmosphere within acceptable conditions, demonstrate parachute system feasibility and present the design trends necessary for Voyager mission trade-off analyses.

"Results indicate," the paper continues, "that multi-stage, two decelerator operation increases the equilibrium descent time required for scientific measurement in the Mars atmosphere, compared to the singular decelerator option, reefed and nonreefed for specific Voyager vehicle parameter assumption."

On September 9, members of the group will tour the NASA Manned Spacecraft Center in Houston.

This conference is the first of the Aerodynamic Deceleration

Systems Committee, which was formed last year by the AIAA after a lengthy campaign by deceleration systems personnel who sought recognition as a science.

Mr. Knacke, who spent many years trying to obtain recognition for deceleration systems, will become the committee's chairman next January 1, beginning a two-year term.

Recently, he said:

"Recovery and landing systems have been a sort of stepchild for a long time, but the establishment of this committee means the science of recovery systems will gain long-needed recognition."

PLANES

(Continued from page 1)

Skyhopper, his first powered plane.

He followed this up the next year with a 65-horsepower Smith Miniplane. Both have since been sold.

Then, in 1963, Mr. Thenhaus began working on the T-18. The first two had been of metal, fabric and tubing, but the T-18 is an all-metal craft.

Finally, when the T-18 was completed, Mr. Thenhaus had it inspected for approval by the Federal Aviation Agency. Home-built planes come under the "experimental" classification, as designated by the FAA.

Mr. Thenhaus and a friend, pilot Lee Hamlin, took the T-18 to a "fly-in," sponsored by the Experimental Aircraft Association, of which both are members.

The first fly-in for the T-18 was at Rockford, Illinois. It was next shown at Georgetown, Texas, last October.

In December, Mr. Thenhaus' T-18 was featured in an issue of Sport Aviation, monthly magazine printed by the EAA and by its president, Paul Poberezny, also editor of the magazine.

Mr. Thenhaus again was featured in the magazine in July, when an article appeared, titled "Tribute to Ralph Thenhaus — Sailplane — Skyhopper — Miniplane — T-18 No. 3."

This summer, the T-18 was piloted by Mr. Hamlin to a trophy in the AC Sparkplug race from Kirksville, Missouri, to Rockford, Illinois. Pilots must estimate their total fuel consumption and elapsed time for the race, before beginning it. In winning, Mr. Hamlin received \$300 and a trophy.

Today, 40 years after he became interested in planes, Mr. Thenhaus has a new set of plans on his work bench. A five-cylinder engine waits on a nearby stand — waiting for a Heath Parasol, which soon will be built around it.



THE MINIPLANE—A Smith Miniplane, with a 65-horsepower engine and a 110-mile-an-hour cruising speed, was Ralph Thenhaus' second powered project. He built it in 1962. At left is Mr. Thenhaus' newest creation.

NORTHROP NEWS

NORTHROP VENTURA

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September 14, 1966

Roy Murray Heads New El Paso Office

Northrop Ventura has reopened its Southwestern District Office at El Paso, Texas.



Mr. Murray

Colonel Roy Murray (USA, ret.), a member of the Division's Long Range Planning Staff since 1964, has been named to head the office.

Accelerating business potential in the Southwestern area is the primary reason for reopening the office, according to T. H. Flannigan, manager of the Marketing and Planning department.

The Army Air Defense Center at Fort Bliss, near El Paso, is the largest user of target drones in the country. At one time the Division maintained a complete target launching and recovery and repair service at El Paso.

Office duties include evaluation of technological and operational requirements of all agencies of the Department of Defense, which relate to Northrop Ventura capabilities, Colonel Murray said.

Colonel Murray was commandant of the U.S. Army Combat Surveillance School at Fort Huachuca, Arizona, prior to his joining Northrop. He commanded one of the six U.S. Ranger battalions active during World War II.

Range Ships Contract Won by Nortronics

A contract in excess of \$650,000 for shipboard spares to support marine star tracking systems used on Apollo moon program range ships has been awarded to the Needham department of Northrop Nortronics.

The star trackers, produced by Northrop under a previous contract, are used to monitor and update shipboard inertial navigation systems (SINS) aboard the five Apollo tracking ships. Both awards were made by the Sperry Gyroscope Company, Great Neck, New York, prime contractor for the SINS.

BY MRS. BOB HOLLY

'Incredible Feat' Saves Drowning Tot

The wife of a Northrop Nortronics engineering assistant emerged from the Labor Day holocaust of accidental deaths a life-saving heroine despite the fact she is partially disabled.

Mrs. Robert (Clara) Holly, whose husband works at Nortronics Applied Research department in Newbury Park, rescued a drowning two-year-old child from a backyard swimming pool September 4 while visiting friends in Lafayette, California, a few miles northeast of Oakland.

"I can't swim a stroke," Mrs. Holly said. "I can walk short distances, but I lose my balance and fall very easily and then I need help to get up. But when I saw the boy tumble into the pool I didn't give falling a thought.

"I walked toward him, supporting myself against the wall at the side of the pool. After reaching the far end of the pool, I lay on my stomach on the concrete apron and tried to reach him.

"He was just out of reach under the water, but suddenly he

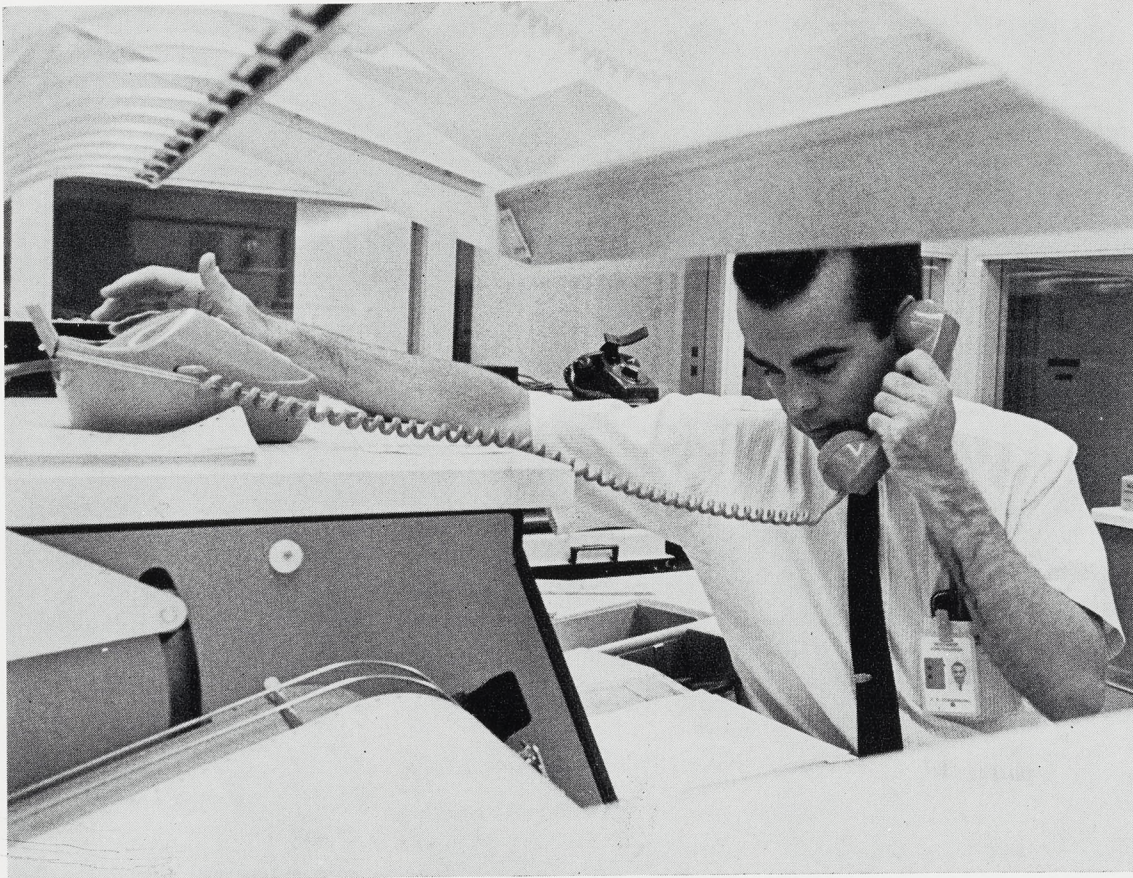
rolled over and his arms came up. I grabbed one of his hands, pulled his head out of the water and called for help. Others came running from the house and pulled the boy out. He was all right but crying."

The boy was Paul Cohn, son of Stephen Cohn of Martinez, California, who, like the Hollies, was visiting the home of Mr. and Mrs. Art Clark.

In reaching the boy, Mrs. Holly covered a distance of about 50 feet.

(See RESCUE, page 6)

AN ELECTRONIC CALL



John P. Strassburg, Northrop Ventura computer operator, uses special telephone equipment to feed data from Ventura machines into Northrop Data Processing (NDP) systems

at Norair. The Ventura systems will be programmed to feed into the new IBM 360/65 computer network at NDP Operations offices.

ONLY 10 SHOPPING DAYS LEFT UNTIL DIVISION PICNIC

Two additional clowns and a monkey act have been scheduled to perform at the annual Northrop Ventura employees' picnic, to be held next week at Vasa Park in Agoura.

Pony rides, a merry-go-round, a puppet show and other rides also will be in operation at the September 24 event.

The picnic is sponsored by the Northrop Ventura Recreation Club. It will begin at 10:30 a.m. and continue until 5 p.m.

Johnnie Via, NVRC Council president, said admission is 50 cents for employees and members of their family 16 and over, 25 cents for children over 6 but not yet 16, and \$1 for other adult guests. Children under 6 will be admitted free.

Admission will include a ticket for food. Hot dogs, hamburgers, soft drinks, popcorn and other snack items will be available.

An estimated 1500 employees and guests are expected to attend.

Product Documentation By Computer Approved

The first phase of an automated Product Documentation System, combining Ventura requirements with Corporate data processing systems, has been approved by Ventura officials.

A product documentation system is simply the combination of specifications, requirements and all other elements which relate to a given contract into a computerized data bank, which may be retrieved in the form of specialized reports.

Division managers met with representatives of an eight-man study team and heard Mike Nolan of Corporate Data Processing discuss probable short and long range benefits.

George F. Douglas, Corporate vice president and Ventura general manager, then gave the go-ahead for the developing of Ventura requirements as they relate to the NDP systems.

"Through the application of

existing Northrop systems," Mr. Nolan said, "Ventura will receive from these computer systems certain automated documentation for contractual and operational requirements."

The objectives, the study team said, are to obtain maximum service at minimum cost, encourage master systems planning, monitor systems development, reduce development and maintenance costs and facilitate upgrading of equipment.

The first application, as approved by Mr. Douglas, will be on Ventura's share of the Boeing 747 project.

Chuck Merlian, Ventura NDP coordinator, said the application of the Corporate systems to the 747 project "will help the customer and functional line organizations in receiving engineering parts lists, parts description reports, reference reports and other data items at low cost and in minimum time."

The study group recommended that the NDP system be utilized in support of other new business, as well. Utilization of the Corporate master parts list system, gross requirements system and automated document control system for the Ventura Boeing contract also were listed as goals.

Norvel Humphreys of NDP, leader of the study group, said all Ventura systems inputs have been correlated with existing and planned NDP systems.

Members of the study team, in addition to Mr. Merlian and Mr. Humphreys, are Jim Kleinman, Wayne Beeman, Bob Hutton, Paul Culver and Dan Cashier, all from Ventura, and Ron Heggeland, from NDP.

Apollo Team Praised After ELS Okayed

Northrop Ventura's Apollo team has completed a highly successful 2-day Design Review of the Block II Earth Landing System. This achievement is a major milestone on the Block II program signifying that the Earth Landing System design has achieved qualifiable status.

The Design Review was held at the Ventura facility, August 24 and 25, and brought together key personnel from North American Aviation's Space and Information Systems Division, NASA's Manned Spacecraft Center and Northrop Ventura Engineering and Project Management.

The meeting was jointly chaired by R. E. Lenhart, Northrop Ventura chief project engineer and P. H. Young, assistant designated subsystem project manager. A presentation of all aspects of the ELS design was made by Northrop Ventura Engineering personnel, including R. J. Boulanger and W. C. Buhler, project engineers; R. B. Kipp, Mechanical Design; W. W. Bjerke, Fabric Design; and R. E. Shewmaker and B. F. Johnston, Engineering Test.

Following the presentation, NAA and NASA representatives participated in discussions covering extreme detail to ascertain compliance with current specifications and adequacy of performance.

The culmination of the two-day conference was the approval of the ELS design with minimal administrative action to formalize the completion of the Review.

Northrop Ventura's Apollo team is now proceeding with the fabrication and assembly of the Block II ELS which will be qualified in an aerial drop test program

(See APOLLO, page 6)



Creating lifelike flowers from crepe paper, plastic leaves and green wire stems is the handiwork of Lee Recchia, accounts payable clerk in Finance at Northrop Ventura. She's a member of the Arts and Crafts Club at Ventura, which works in oil painting, water colors, interior decorating, sculpture and other media.

AD ASTRA PER ASPERA

NASA Announces Experiments For Mariner Mars Flight in 1969



Two television cameras, an infrared spectrometer and other data-collecting equipment, will be installed on the Mariner Mars spacecraft scheduled for launch in 1969, NASA officials have announced.

The cameras and spectrometer will be accompanied by an infrared radiometer, an ultraviolet spectrometer, a celestial mechanics system and an S-Band occlusion system.



Mr. Munk

The equipment was selected by NASA to increase knowledge of the Martian atmosphere and terrain, and to determine its orbit more precisely.

The data will be used in planning for landing instrumented spacecraft on the planet, NASA officials said.

Northrop Space Laboratories has a contract to design, develop, build and test the engineering mechanics subsystems for the Mariner Mars '69, under direction of the Jet Propulsion Laboratory.

Northrop Space Laboratories has a contract to design, develop, build and test the engineering mechanics subsystems for the Mariner Mars '69, under direction of the Jet Propulsion Laboratory.

The contract includes the fabrication of parts of the structure, mechanisms, flight electrical cabling and the temperature control system.

Both phases of the contract, designated Phase I and Phase II, began on August 3. Phase I includes preliminary design and detail design. Phase II consists of fabrication, assembly and testing.

Robert Munk is program manager and Ralph Hakes is assistant program manager.

The Mariner will be launched by an Atlas-Centaur from Cape Kennedy sometime between February and mid-April in 1969.

It will reach Mars in late August or early September, and is expected to fly past the planet at an altitude of about 2000 miles.

When the Mariner passes Mars, two television cameras will take both high and low-resolution pictures of the surface.

The pictures will be used to provide knowledge of the general exterior features of the planet, including geologic history, such as evidence of change in the shape of craters.

Data gained from the infrared spectrometer is expected to provide information on atmospheric composition, such as carbon dioxide, hydrogen and oxygen, as well as surface composition, temperatures and atmospheric photochemistry.

The infrared radiometer will be used to de-

termine the temperatures of individual areas on the surface.

Through use of the celestial mechanics system, investigators hope to improve knowledge of the masses of Mars and the moon, the distance from the earth to the sun, and the precise orbits of earth and Mars.

The S-Band occlusion equipment will be used to further information on density, extent and composition of the Martian ionosphere.

SAE in Los Angeles

Eleven Northrop Corporation men are scheduled to participate next month in the 1966 National Aeronautic and Space Engineering and Manufacturing Meeting, to be held in Los Angeles.

The meeting, sponsored by the Society of Automotive Engineers (SAE), will be held October 3 through 7 in the Statler Hilton Hotel.

One of the meeting's sponsors is Richard E. Horner, Corporate senior vice president-Technical. He's been named sponsor of the Manufacturing Forum Executive Committee.

Jack Mannion, Norair vice president of Manufacturing, is on the Executive Committee.

Also working in the manufacturing forum are Paul Warren, Bernard Gaiennie, C. Z. Stine, J. G. Louvier and R. E. Clemens.

Mr. Warren, senior manufacturing research engineer, will discuss "Manufacturing Development to Production" at an October 4 meeting.

Mr. Gaiennie, administrator of Manufacturing Research and Development, is planning an October 4 meeting, titled "Organizing for New Manufacturing Techniques."

Mr. Gaiennie also is co-chairman of publicity.

Both Mr. Stine, of Industrial Training, and Mr. Louvier, of Metallurgical Engineering, will be on the panel for "Organizing for New Manufacturing Techniques."

Mr. Clemens, a senior quality control engineer, will be among four men discussing "Product Qualification-Nondestructive Testing," in an October 3 meeting.

All are Norair employees.

Four other Norair men are working on the aeronautic session of the meeting.

C. W. Eyres and S. L. (Pete) Shaw, members of the technical staff of the vice president-Engineering, will be on the Program Planning Committee.

H. K. (Ted) Hanchett, supervisor of AGE Requirements, will be chairman and organizer of the session on Aircraft Ground Support Equipment. With him on the session will be P. L. Williams, senior engineer.

HEARST CASTLE TRIP PLANNED BY TRAVEL CLUB

Hearst Castle in San Simeon will be the destination of the NRC Travel Club on October 22 and 23.

In addition, the two-day bus trip will feature a two-hour stopover in Solvang, a nearly authentic Danish village north of Santa Barbara.

The group will leave Plant 1 at Norair at 9 a.m., October 22 on an air-conditioned bus. At noon, the group will stop for lunch at Andersen's Split Pea Soup Restaurant in Buellton, near Solvang.

Following lunch and the sight-seeing stopover in Solvang, the trip will continue to Morro Bay, and the Golden Tee Resort Lodge.

The next morning, the group will leave Morro Bay for Hearst Castle. Two tours will be offered: one of the upper floor, called La Casa Grande; the other, of the lower floor, called Enchanted Hill.

The price of the trip is \$19.75 for the upper floor tour, and \$18.75, including the lower floor tour. The cost also includes transportation and a double occupancy room at the Golden Tee Resort Lodge. It does not include meals.

Mariposa Receives Pony League Award

A "Special Achievement Award," the first ever presented by the North Torrance Pony Baseball League, has been awarded Northrop Norair personnel assigned to the Mariposa facility.

The award honors three years of continued support of the league's activities in the field of junior baseball.

More than 100 Northrop employees contributed to league activities this year. In the past two years, upwards of 50 each year have lent their support.

Steve Kadoich, a Norair Quality Control inspector, was president of the league during the past year and presented the award recently.



One of the largest single rolled steel beams is in place at Plant 3, Northrop Norair's Transport Facility. The 60-foot beam, which weighs nearly 30,000 pounds, will divide the building's 45-foot high bay areas.

Agreement Signed With Hallicrafters

Northrop Corporation and The Hallicrafters Company have signed an agreement for the acquisition by Northrop of substantially all of the assets of Hallicrafters. The signing followed approval by the boards of directors of the two companies of the terms of the acquisition.

Completion of the transaction is contingent upon favorable actions by the shareholders of both companies. It is also subject to approvals by the pertinent government agencies.

DATE WITH 'THE VOICE'



Mrs. Joan Ririe, the voice of NORVIPS, Northrop Nortronics voice warning system, chats with crew members of USS Roncador. Submariners, such as those on Roncador, will be hearing Mrs. Ririe's voice in the event of a malfunction in any of numerous operating systems on board. Voice warning, which is used extensively on aircraft, is designed to relieve visual fatigue of operators who, in the past, have monitored their craft's operation by watching panels of lights, gauges, and other instruments.

TRAINING UNDER WAY

A Chance for Mexican-Americans

Initial aircraft assembly trainees arrived at Northrop Norair last week to begin an on-the-job instruction program through a pioneering venture between the Mexican-American Opportunity Foundation and Northrop.

The men began work on Tuesday, September 6. The Personnel Development and Training group is supervising their progress. After a period of 8 to 12 weeks, the training will conclude, and the men will be assimilated as aircraft assembly personnel.

A contract which hopes to place as many as 24 trainees was arranged between Northrop and the Mexican-American Opportunity Foundation. Foundation officials and three Northrop men—Frank Smith, Roland B. Scott and Frank Macias—were present at the contract signing.

Mr. Smith is Corporate director of Industrial Relations.

Mr. Scott, Norair Community Relations coordinator, and Mr. Macias, a Northrop Space Laboratories biochemist, have served as Foundation directors for two and three years, respectively.

Northrop Corporation has supported the Mexican-American Opportunity Foundation since its inception three years ago, just as it supports the Equal Opportunities Employment Program.

The contract for the on-the-

KCET Plans New Aerospace Series

Everything from detecting life on Mars to the Sealab II experiment will be discussed this month on "R&D Review," an educational television series on KCET (Channel 28).

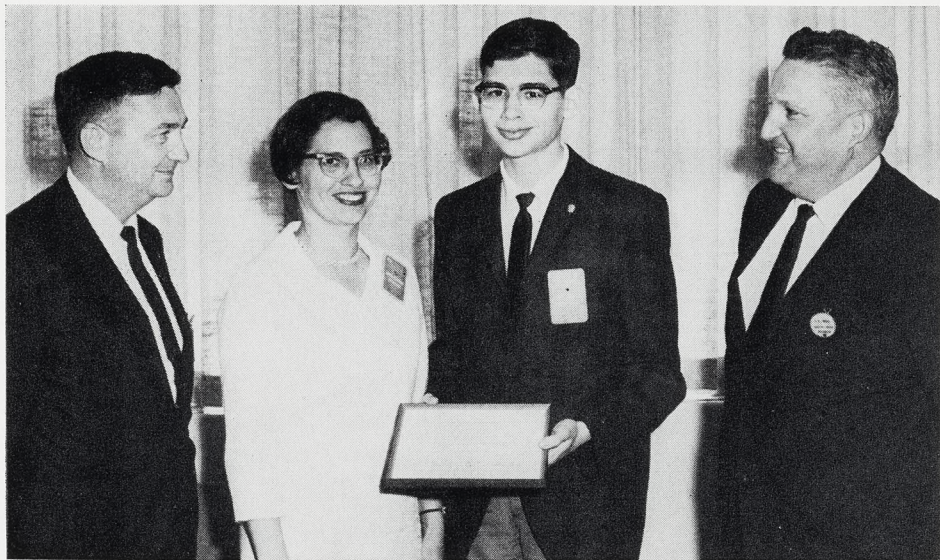
Each show will be seen at 9:30 p.m. on Thursdays and at 8:30 p.m. on Saturdays. Dr. Martin Klein will be moderator.

job training program at Northrop was the first issued through the Foundation and was signed during ceremonies opening new Foundation headquarters at 4629 E. Brooklyn Ave., Los Angeles.

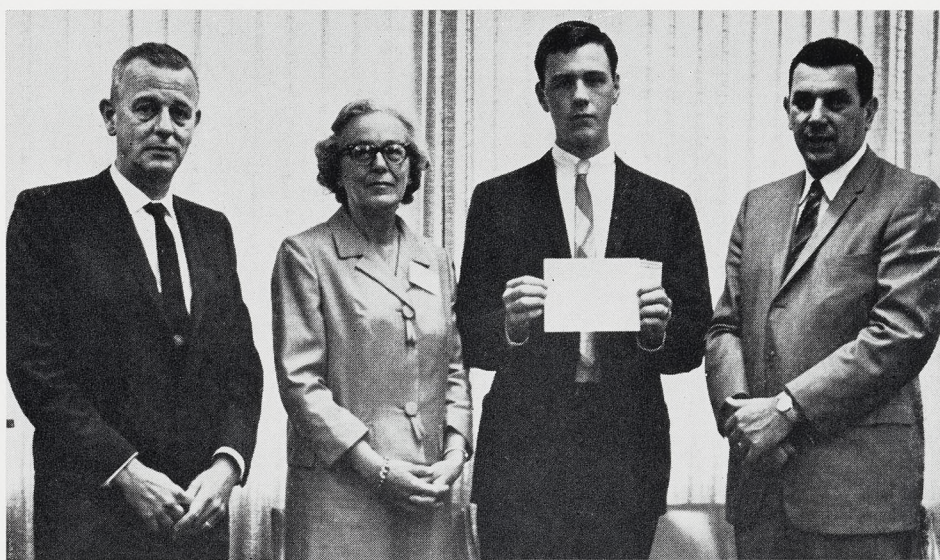
The Mexican-American Opportunity Foundation is supported by a \$198,000 grant from the U.S. Department of Labor in addition to help provided by firms and organizations in the area. Dionicio Morales, Foundation executive director, said the Foundation hopes "to open doors to new opportunities for Mexican-Americans in education, training and employment."

Mr. Morales said training will be established for 400 applicants initially. Most are men who have been displaced from their jobs by technological changes and have not yet had the chance to receive job training.

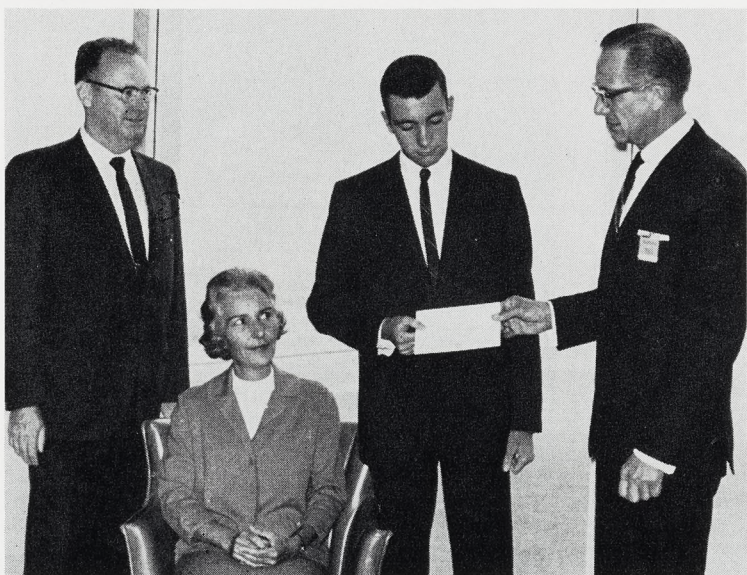
NATIONAL MERIT SCHOLARSHIP WINNERS MEET COMPANY EXECUTIVES



Loffin E. Elvey Jr., Mr. and Mrs. Elvey of Nortronics Precision Products department, visit with Les Grohe, Nortronics vice president and PPD manager.



Carson E. Agnew, son of George E. Agnew of Northrop Norair, displays his Merit Scholarship certificate, presented by Welko Gasich, Northrop vice president.



Roger Hudson, son of Mr. & Mrs. Leslie Hudson, receives his National Merit Scholarship from H. E. Riggins, Northrop Ventura vice president and assistant general manager.

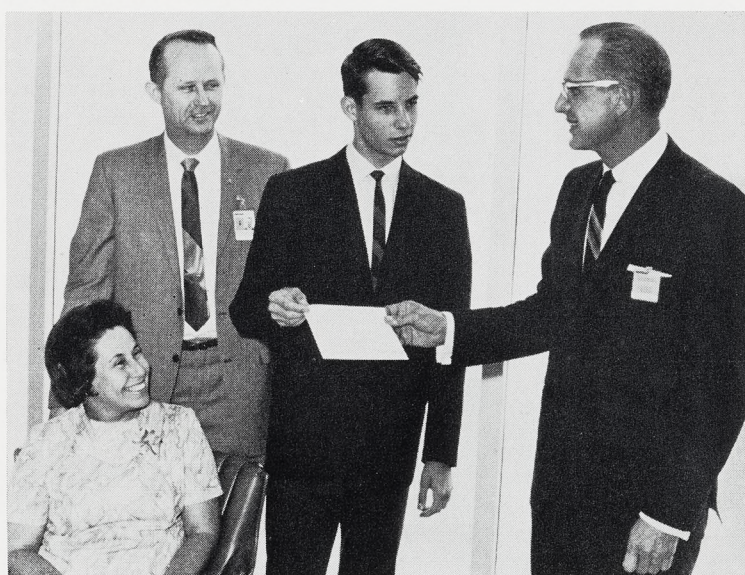
Six sons and two daughters of Northrop employees will be enrolling in colleges throughout the country in the next few weeks as holders of Northrop Corporation Merit Scholarships.

Each of the eight received from \$1000 to \$6000, depending upon need, to cover four years of undergraduate study at any college or university.

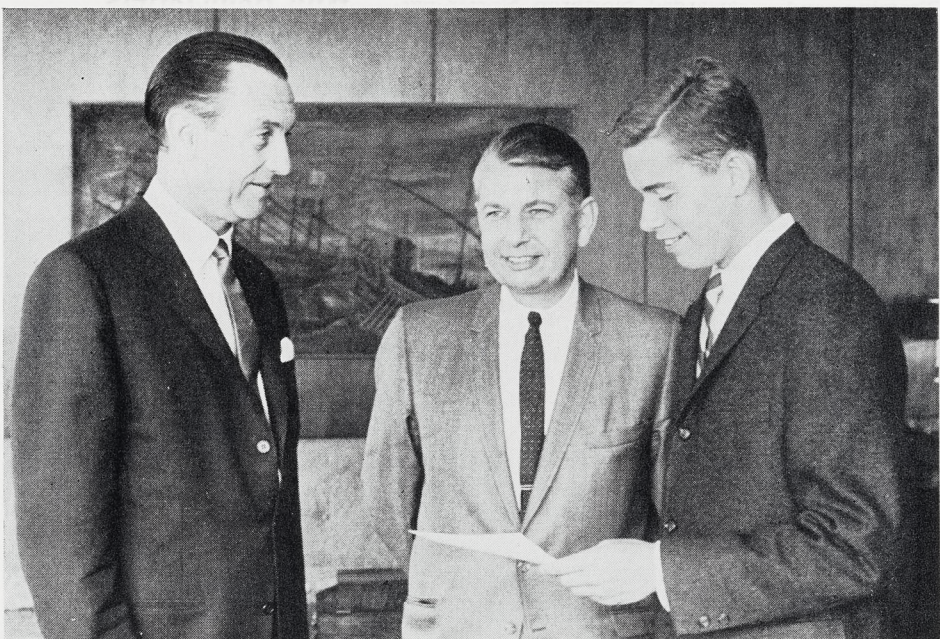
The winners and their parents recently visited Northrop offices, where the students received certification of their scholarship.

Two of the winners are not shown in these pictures, as none were available. One is Marlene Price, daughter of Mr. and Mrs. Richard Price (Page Communications).

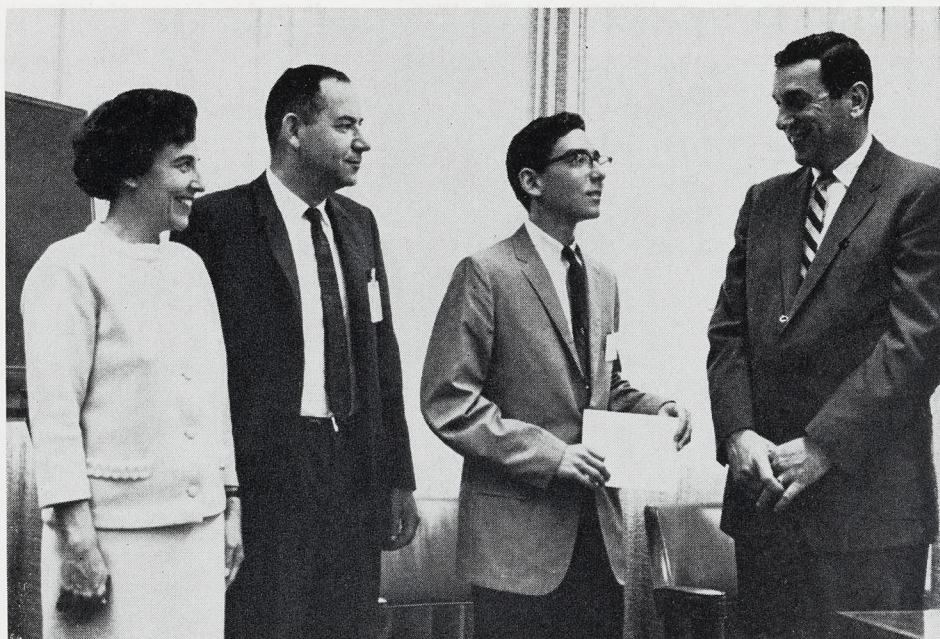
The other is Susan Rothstein, daughter of Dr. and Mrs. Lewis R. Rothstein (Northrop Carolina).



James Chapman, son of Mr. & Mrs. Blair Chapman of Northrop Ventura, receives his certificate from Mr. Riggins.



William Ellet III, son of William Ellet Jr. (center), of Corporate Marketing, visits with Northrop President and Chairman Thomas V. Jones.



Welko Gasich talks with Jerry Gechter, son of Mr. & Mrs. Bernard J. Gechter of Northrop Norair.

BALLET HONOR WON BY DAUGHTER OF HUNTSVILLE MAN

Eighteen-year-old Cheryl Babcock, daughter of NIKE-X systems engineer Edward S. Babcock, combines her studies with an interest in ballet—and has won honors in both.

Miss Babcock, an education major at the University of Alabama, graduated with honors from Butler High School in Huntsville in June.

Later in the summer, she was the only ballet student in Huntsville to earn the rating of "highly commended" in all portions of the judging.

Mr. Babcock, formerly with Northrop Ventura, joined the Northrop Space Laboratories Huntsville department in 1965.

His son, Edward, 19, is a student at West Point.

The U.S. Army's 6164th R&D Detachment is a most unusual Army unit—and that's what makes it interesting to its 13 members.

Five of the 13 men hold graduate degrees at the doctorate level; one is a speech pathologist; another, a physician; and another, a research mathematician.

Still another is Northrop Corporation's Rich Carlson, a major in the unique detachment.

The "R & D" in the unit's name is for Research and Development,



Mr. Carlson for Research and Development,

and the men in the Army Reserve group—all officers—are specialists in some phase of science, mathematics, engineering or related field.

Mr. Carlson, of Corporate Data Processing, has been in the unit for a year and has found it "a lot of fun, and extremely worthwhile."

"We meet twice a month," he said, "and we discuss our specialties."

"At one meeting, an engineer spoke on undersea exploration technological advances. I've discussed data processing, and we've heard from the mathematicians and physicists."

Contributing further to the group's unusual status, there is no summer training, although individuals may volunteer for

two-week scientific seminars.

The 6164th R&D Detachment is one of three such units in the county—others are headquartered in Pasadena and in Maywood—and is one of about 70 in the nation.

The 6164th meets throughout Southern California, and is officially headquartered in Santa Monica. Coordinating the special program is the U.S. Army Department's chief of Research and Development, in Washington, D.C.

Officers in the R&D unit earn points toward retirement at age 60, as do members of other Army Reserve organizations. They qualify for promotion at regular intervals, and can reach the rank of full colo-

nel.

Mr. Carlson served in World War II and the Korean War in communications and logistics, achieving the rank of major.

"We are looking for people who are interested in what we are doing," he said. Prospective members must be Reserve officers in either the Army or National Guard, as the Navy and Air Force have their own R&D organizations.

An applicant must have a science degree, and graduate degrees are preferred. Applications are reviewed by the office of the Army chief of Research and Development.

Additional information may be obtained by calling Mr. Carlson at extension 2458 at Norair.

R&D REPLACES PT

Science Is All That Marches in Unique Reserve Unit



9000 TURN OUT FOR PICNIC; JEAN ROBERTS WINS TOP PRIZE

Mrs. Jean Roberts, a clerk in Nortronics-Hawthorne's Quality Analysis group, was one of about 9000 Northrop employees and guests to attend the annual NRC picnic this year.

But Mrs. Roberts, unlike all the others, was the winner of the drawing, giving her an all-expense-paid trip for two for a week-end in Las Vegas.

"I was on the picnic's helicopter ride when they held the drawing," Mrs. Roberts said, "and I didn't know I had won until the day after the picnic." Mrs. Roberts has been with Nortronics for nearly two years.

In all, Northrop families and their guests ate 6700 hot dogs, 7500 bags of popcorn, 7500 cups of ice cream, 2300 snow cones and 1570 cotton candies, and drank 7500 cups of cola.

The picnic was held Sunday, August 28, at the Los Angeles County Fairgrounds in Pomona. One county fair official told Bill Wareing, NRC president, that it was the largest private picnic he had ever seen at the fairgrounds.

Although the hours were 10 a.m. to 7 p.m., families were still coming in well after 6 p.m., Mr. Wareing said.

Activities included children's rides, helicopter rides, stage entertainment, a model airplane demonstration, and four hours of live music.

Mr. Wareing said present plans call for a "repeat performance" at the County Fairgrounds next year, because of the response this year.



PHOTOS BY DAVE SALDANA



Classified

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private business are not accepted. The Northrop News reserves the right to edit or omit ads. Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

For Sale

Engagement ring, full carat, 4-diamond wed. band, interlocking, new, \$175. L.A., 645-5610.

Exec. Home, 4-bdrm. inc. lge. master bdrm., 1 3/4 baths, nearly 2100 sq. ft., 2-car gar., lge. fireplace, elec. kitchen w/bltins, cpts., dps., within walking dist. of Northrop, 6 1/2% take over loan avail., \$34,950. Hawthorne, PL 6-9659. A

Home, 5-bdrm., 3 1/2 bath, on view lot, convenient to Nor. Anaheim, \$77,000. W. Covina, 339-8008. A

Couch, & matching chair, good tweed, 1-yr. old, modern, \$95. Northridge, 360-5092. A

Movie Camera, 1965 Keystone Horizon, 8mm, model K-865 sensiron, load-a-matic, 2-sp., elec. dr. w/lite-guard, f/1.8 focusing zoom lens, reflex view finder, pistol grip, \$165. Torrance, 375-4593. A

House, 3-bdrm., or 2 & a den, garb. disp., 1 3/4 bath, sprinklers, water softener, 5 min. from Northrop, \$23,995. L.A., 757-3595. A

House, 3-bdrm., 2-bath, fenced yd., 4 1/2% G.I. loan, 5 min. from Northrop, bltin vacuum system, \$26,000. Gardena, DA 4-9321. A

Autoette, used 1 month, \$600. Torrance, DA 5-7154. A

Camping Trailer, 15', 1961 Corsair, eastern blt., insulated, butane wall heater, self-contained, \$550. Torrance, 371-1905. A

Ford, 1965, Galaxie 500 convt., low mileage, \$2200. L.A., PL 6-2587. A

MGA, 1957 roadster, r/h, new top, good body & interior, 3 new tires & service manual, \$495. Torrance, 375-4846. A

Corvette Sting Ray, 1963, fast back, astro wheels, \$2500. Santa Fe Springs, 863-5868. A

Home, 3-bdrm., paneled den, lge. all-elec. kitchen, patio, block wall fencing, 4 3/4% loan or refinance, \$20,950. La Mirada, 944-1734. A

Home, 3-bdrm., 1 3/4 bath, bltin. appliances, f/place, ash panel doors, h/wood floors, fenced & landscaped w/sprinklers, 4 1/2% G.I. loan & 6% second avail., \$31,000. P.V., 378-5475. A

Lot, 1/2-acre w/3-story unfurn. bldg., in Palos Verdes, \$18,000. Lawndale, 371-3919. A

House, 3-bdrm., 2 bath, dble. gar., lge. family rm., 5 yrs. old, 20 minutes to Norair, existing loan of \$18,500 at 5 3/4%, \$145 monthly pymt., owner will take 2nd on part of bal., \$23,950. Wilmington, 830-0740. A

Baby Carriage, imported, collapsible, ball-bearing wheels, parking brake, leather slings, \$25. Torrance, 324-5698. A

Correspondence Course, NRI course in electronics, principles, practices & maintenance incl. all kits & books, orig. price \$320, \$75. Inglewood, 672-6647. A

House, 3-bdrm., indoor patio, 2-car gar., fully landscaped, \$32,500. Torrance, FR 8-1350. A

Gas Range, 4-burner w/broiler & storage compartment, \$25. Inglewood, 671-5242. A

TV, 19" port., Silvertone, \$45. Santa Monica, EX 4-8641. A

Stove, gas, 4-burner w/oven, \$25. West L.A., 277-2549. A

House, 4-bdrm., 2-bath, family rm., 1800 sq. ft., all bltin kitchen, cpts., dps., 3/10 mile from Norair, \$27,500. Hawthorne, 679-2307. A

Studio Couch, maple, \$30. Hawthorne, OS 6-3410. A

Honda, 250 Scrambler, \$500. Inglewood, 676-8982. A

Mobile Home, 1963, Viking Imperial, 12'x60', tub & shower, cpts., custom dps., alum. awning, skirting & carport, \$9000. Torrance, 213-370-4641. A

Honda 50, 1965, 2, 140 mpg., 1000 miles, \$175 ea. Torrance, 378-8872. A

Volkswagen, 1966, 1300, radio, seat belts, \$1600. Torrance, 327-8226. A

Sofa, 10' custom-made, 4-cushion, never used, cost \$895, \$400. P.V. Pen., 377-7670. A

Wing Chair, large print, \$30. Hawthorne, 675-7965. A

BSA, 1957, custom, 650 cc, all chrome, \$625. Gardena, 324-3919. A

Pups, thorobred German Shepherd, strong-heart line, silver greys, black & whites, \$50. Malibu, GL 7-2688, GL 7-7621. A

Austin Healey, 1959, deluxe, r/h, o/drive, wire wheels, low mileage, \$875. Rolling Hills, 377-8731. A

Ford, 1959, 2-dr. sta. wagon, 6-cyl., needs tires, \$135. Torrance, FR 4-9885. A

Rifle, custom-bltd., 300 Weatherby Magnum, birds-eye maple stock, \$100. Redondo Bch., 379-4559. A

Trailer, 1962 Northwest Coach, 16', sleeps 6, elec. brakes, dual tanks, spare tire, jacks, \$925. Gardena, DA 9-8009. A

Spare Parts for Panhard, points, condenser, about \$12 worth of new parts, \$4. Hawthorne, 679-2983. A

House, 3-bdrm., single bath, disposal, cpts., fenced, 20 min. to Northrop, \$23,500. Torrance, 370-2794. A

Dodge Phoenix, 1960, r/h, auto. trans., p/s, factory air, near new tires, \$450. Fountain Valley, 531-3197. A

For Sale

Oldsmobile, 1961 Holiday coupe, fully equip., low mileage, \$1025. Fullerton, 528-8582. A

TV, 21", 1958 Spartan, lobby/table model, blond w/ebony legs, \$40. Torrance, 370-0239. A

Buick, 1961 Special, 4-dr. wagon, auto., p/s, near new tires, \$995. Torrance, FA 8-0710. A

Panel Truck, 1938 Chevrolet, 1/4-ton, r/blt. eng., trans. & rear end, new paint, tires & brakes, \$600. Torrance, DA 3-1026. A

Drum Set, \$50. Torrance, 328-4647. A

MGTF 1500, 1955, eng. o/hauled, new top, \$550. Thousand Oaks, 805-495-5531. A

Golf Clubs, left-handed, 2 thru 9 irons, 1, 2, 3 woods, \$35. Torrance, 324-9193. A

Chevrolet, 1956, 2-dr. sedan, r/h, auto. trans. V-8, \$150. Hawthorne, 644-1096. A

House, 3-bdrm., 1 3/4 baths, lge. lot, fruit trees, \$29,500. Manhattan Bch., FR 9-1728. A

Boat, 14' Burchcraft, o/board w/lights, steering, & cover, \$100. Torrance, DA 3-7544. A

Austin Healey Sprite, 1962, '65 engine, \$750. P. Bend, 377-2921. A

Sprite Parts, misc., competition head, SU carburetors, disc brakes & more, \$200 or sell sep. Box 1801. A

Horse, young, spirited, mare sorrell, 1/2 thorobred, 1/2 quarter, excellent conformation, \$500. Torrance, 375-6250. A

T-Bird, 1963, air cond., p/w, new brakes & tune up, 26,000 miles, \$1725. L.A., OR 2-4828. A

Shotgun, Browning 12 ga. auto., 5 3" Magnum, 32" plain barrel, full choke, recoil pad, \$125. L.A., 384-4017. A

Boat, 14' Nylox runabout, 35 h.p. Johnson; top, curtains & tonneau, trailer, new wheels, tires, \$640. L.A., GR 9-5653. A

Travel Trailer, sleeps 4, stove & ice box, \$150. Gardena, DA 4-6843. A

Volkswagen, 1964, radio w/rear speaker, new tires & new Porsche clutch, \$1350. Redondo Bch., 375-9648. A

Alligators, stuffed from Guatemala, all sizes, from 2' at \$10 to 4' at \$45. Marina del Rey, 823-2655. A

Bicycle, girl's 26", 2-wheel, \$10. Torrance, 835-7887. A

Chevrolet, 1964 Malibu SS, 4-spd., p/b, p/s, 2-dr., rear speaker, take over \$69 mo. pymts., \$1300 bal. plus \$200 for equity. Anaheim, 714-635-1686. A

Baby Furniture, infant seat, car bed, bassinette, & playpen, \$17. Torrance, 371-1096. A

Sextant, James, 4 lens, \$100. Redondo Bch., FR 9-1804. A

Stove, 3-burner Coleman, \$15. Fullerton, 714-525-7685. A

Stamp Collections, assorted, in 2 albums, \$15. Torrance, 371-9925. A

Jump Seat-Recliner, child's, Cosco, \$5. Inglewood, 674-6395. A

Travel Trailer, 16 ft. long, 1958 Shasta, many extras, \$750. Torrance, DA 6-5566. A

Bicycle, 2 20", \$10 ea. Inglewood, OR 2-2370. A

Motor, 1963 Evinrude, 75 h.p., elect. shift, alternator, 2 props, \$625. Hawthorne, 676-7109. A

Alfa Romeo Spyder, 1960, new tires & valve job, \$850. San Pedro, 754-0437. A

Washer, auto. Westinghouse, model LT-110, \$65. P.V., FR 7-4528. A

Chevrolet, 1962, Impala, 4-dr., p/s, p/b, r/h, new tires & brakes, \$1300. Redondo Bch., 370-9795. A

Sign, window-type, elec. lighted w/flasher & extra alphabet, cost \$60, \$15. Hawthorne, 676-1018. A

Motor, outboard, Johnson 25 h.p., manual start, w/boat controls & 6-gal. gas tank, \$75. Hawthorne, OS 6-5219. A

Honda, 1966, 305 Scrambler, 6 wks. old, 650 miles, still under warranty, \$675. P.V. Pen., 377-7555. A

BSA, 1965, 1900 miles, \$325. Inglewood, OR 2-7628. A

Tape Recorder, SJB chrome, for car, incl. 2 tapes, orig. cost \$70; \$55. Rolling Hills, 833-9747. A

Dodge Lancer GT, 1962, r/h, auto. trans., \$9.5. Redondo Bch., 375-1396. A

Austin Healey, MK III 3000, 1966, wire wheels, radio, tonneau, top boot & mitten cover, \$2950. Dana Pt., 714-496-1088. A

Home, 3-bdrm. & den, spacious playyard & patio, near schools & fwy., panel liv. rm., \$21,900. Gardena, DA 9-2904. A

Patio Benches, w/cushions, \$15 ea. Gardena, OS 5-2159. A

TV, 21" RCA, blk. table model on base w/wheels, \$50. Rolling Hills Ests., 325-4303. A

Camera, Yashica Mat. LM, 2 1/4 x 2 1/4 f/3.5 lens, \$45. Lawndale, 370-0197. A

Lawnmower, reel-type, 2 1/2 h.p., \$17.50. Rolling Hills Ests., 375-7038. A

Honda, 1963, 250 Scrambler, racing gear, \$425. Long Bch., 429-9837. A

Sailboat, 10' fiberglass Elgin w/dacron sail & trailer, \$250. Long Bch., GA 7-4197. A

Crib & Playpen, will sell separately, or \$20. Lynwood, 632-2642. A

Stove, gas, \$20. Box 1802. A

Austin Healey, 1961 Model 3000, soft top, plexiglass top, spokes, radio, o/drive, \$1150. Lakewood, 429-6843. A

House, w/Catalina view, 3-bdrm., family rm., dual fireplace, cpts., dps., bltins, near Marymount School, \$36,500. P.V. Pen., 377-4065. A

Chevrolet, 1959 Impala, 2-dr., r/h, V-8 4-spd., 4 new tires, \$650. Torrance, 397-3498. A

TV, 19" portable, w/stand, cost \$150; \$50. Gardena, 323-6538. A

For Sale

Home, 4-bdrm., 3-bath, lge. cathedral living rm., located 1 mile from all 3 P.V. schools, \$56,000. P.V., 377-6100. A

House, 3-bdrm., 1 1/2 bath, den w/fireplace, newly painted, dtch. dble. garage, sprinklers, 2 blocks to elem. school, low down pymt., \$26,000. Inglewood, OS 5-5592. A

Trailer, 1962, self-contained, Bambi Air-stream, \$2300. Rolling Hills Ests., 378-4108. A

Wanted to Buy

Range, gas, & dinette set, in good condition. L.A., GR 2-2551. B

Outboard Motor, 15 h.p. or less, approx. \$75. Malibu, GL 6-2559. B

Aquarium, 20-gallon w/filter, with or without fish. Torrance, 542-1027. B

Transportation car in good mechanical condition, will pay to \$150. Redondo Bch., FR 2-8502. B

FREE (To Be Given Away)

Kittens, to good home. Manhattan Bch., 374-4340. D

Rentals Offered

Apt, 1-bdrm., redecc., near Northrop, water, trash pd., furn., \$90; unfurn., \$75. Lawndale, OS 5-9695. E

Vacation Cabins, Lake Gregory & Crestline, \$25 w/ends; \$60 wk. Venice, EX 1-2040. E

Apt, 2-bdrm., unfurn., 1200 sq. ft., 1 1/2 baths, stall shower, gar. & parkg., 1 mile from Northrop, \$140. Hawthorne, OS 6-5162. E

Apt, 2-bdrm., large, newly furn., walking dist. to Norair, \$135 mo. w/lease. Hawthorne, 675-3686. E

Apt, 2-bdrm., 1 1/2 bath, cpts. & dps., bltins, near schools & recreation, \$125 unfurn, \$155 furn. Inglewood, 644-2565, 672-1890. E

Duplex, front, unfurn., disp., closed gar., 2 lge. bedrooms, water & lawn pd., 5 min. to Norair, \$110 mo. L.A., PL 4-1964. E

Apt, 2-bdrm., unfurn., cpts., dps., range, garb. disp., carport, laundry rm., 6 blocks from Norair, no dogs, \$100. Hawthorne, 671-3261. E

Duplex, unfurn., 1-bdrm., 5 min. from Northrop, water & trash pd., in Inglewood, \$80 mo. Torrance, TE 5-8687. E

Unit, 2-bdrm., on waterfront, Huntington Harbor, 46' boat slip, gar., year lease, \$300. Orange, 714-637-8648. E

Apt, 2-bdrm., unfurn., pvt. patio, closed gar., sound cond., hobby shop, hot water & trash pd., \$125 mo. Torrance, FR 5-0867. E

House, 3-bdrm., 2 baths, fam. rm., fireplace, cpts., dps., patio, blockwall, atrium, water pd., 3 yrs. old, in Thousand Oaks, \$185 mo. Long Bch., GA 4-9750. E

Cabin, Big Bear Lake, mod., sleeps 7 to 9, \$18 w/end; \$50 wk. Bellflower, TO 7-0662. E

Apt, 1 & 2-bdrm., unfurn., 1-bdrm., furn., near shopping & schools, \$110 mo. & up. Woodland Hills, 347-5000. E

Apt, large 2-bdrm., modern, \$180 mo. Newport Bch., 714-646-7605. E

Vacation Cottages, Idyllwild, 1 & 2 bdrms., secluded, stream, patios, \$22-\$35 w/ends; \$50-60 wk. L.A., PL 4-5288. E

Exec. Apt., 2 & 3-bdrm., bltins, dps., cpts., closed gar., walking distance of Northrop, \$125-\$225. Hawthorne, OS 6-2501. E

Apt, 3-bdrm., next to Century City, all utilities, \$125. W. L.A., 277-0594. E

Apt., 1-bdrm., unfurn., close to San Diego Fwy., \$85 mo. L.A., 671-5761. E

Apt, unfurn., 1-bdrm. studio & 3-bdrm., 2-bath, 3 blocks from King Harbor, cpts., piped music, bltin vacuum, gar. storage, \$115 mo. Redondo Bch., FR 6-9608. E

Apt, 1-bdrm., furn., very pvt., all bltins, pvt. deck, lge. pool, ample sub. parking, near Northrop, \$135 mo. Lawndale, 679-2117, 670-6084. E

Child Care Wanted

Child Care for 2-5 yr. olds, reasonable rates. Gardena, DA 3-0955. G

Child Care Offered

Reliable woman to care for 2 girls, ages 3 & 4, in my home, 8 a.m.-4:30 p.m. Torrance, 323-9598. H

Personals

I am on crutches due to polio & my 2 feet are different sizes. I have pairs of shoes to exchange, free, or will go shopping with you. Left foot, 7 or 7 1/2; right foot, 8 or 8 1/2, no pointed toes, low heels. Inglewood, OR 2-9002. L

To our wonderful friends & the Northrop Recreation Club, for your kindness, thoughtfulness, & generosity during our time of sorrow, all we can say is a humble "thank you." DOROTHY HARRIS & FAMILY. L

My daughter, Lynn & I wish to express our sincere appreciation for the flowers, cards, donations to the Heart Fund & personal letters in my husband's memory. MRS. A. S. TURNER. L

Ironing, by Nancy at home, \$1 hr. Hawthorne, 644-2440. L

I wish to express gratitude & sincere appreciation to all my friends at Northrop for their consideration & cards at the recent passing of my brother. L. B. KEY. L

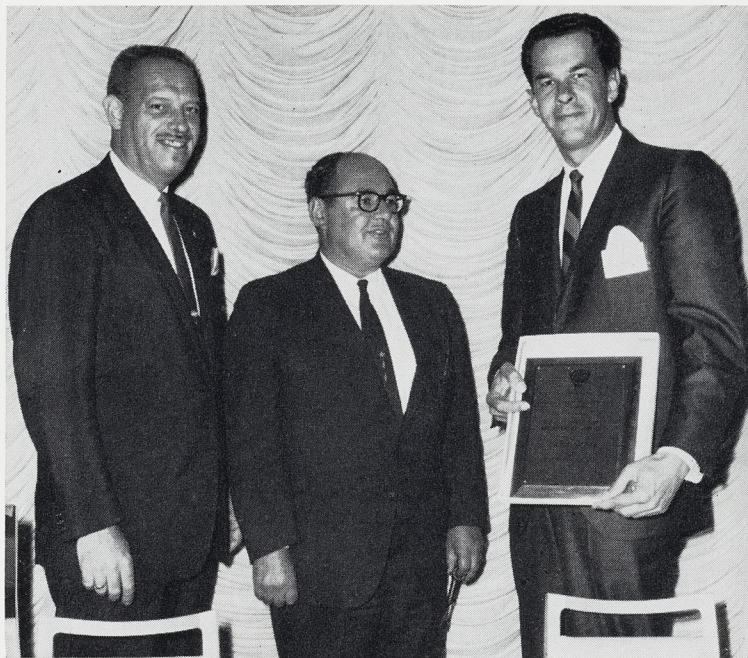
Garage, for rent, storage only. L.A., PL 9-4391. L

For Sale or Trade

Kitchen Cabinet, 5-dwr., birch base, dble. kit. sink cab., dble. oven, birch cab., \$200 or trade for 2' shell camper for pickup truck. Torrance, 325-8212. M

Pick-up, 1949 Ford, 3/4-ton, '57 eng., 6-cyl., \$175 or trade for welding equip., metal working machinery, compressor, or guns. Hawthorne, OS 9-3476. M

CARL FAIRBANKS AWARD



Jack Gantz (right) of Northrop Nortronics receives annual Carl Fairbanks Award from the Society of Photo-Optical Instrumentation Engineers for his contributions to the highly successful Airborne Lightweight Optical Tracking System (ALOTS), developed and built at Nortronics Palos Verdes facility. The award is made annually for a significant industry contribution to the advancement of photo-optical instrumentation engineering. Presenting the award are R. P. Murkshe (left), president of SPIE, and Duncan E. McDonald, member of the National Scientific Advisory Board.

Three Pilots Now Assigned To Lifting Body Program

Two test pilots — an Air Force captain and a former Marine — have been assigned by NASA to the M2-F2 and HL-10 manned lifting body flight test program.

Both wingless lifting body vehicles are built by Northrop Corporation.

The men are Captain Jerauld R. Gentry, an Air Force officer since 1957, and Bruce A. Peterson, a NASA research pilot and engineer since 1960.

They join Milton O. Thompson, chief lifting body research pilot for the NASA Flight Research Center, who piloted the M2-F2 last July. It was the

first flight ever conducted with a manned all-metal lifting body.

Captain Gentry, 31, represents the Air Force Flight Test Center in the manned lifting body program.

He is a 1957 U.S. Naval Academy graduate, and was a F-100 pilot in the Tactical Air Command.

He, his wife, Arden, and two children live in Edwards, near the NASA Flight Research Center.

Mr. Peterson, 33, attended UCLA and California State Polytechnic College at San Luis Obispo. He was graduated in 1960 from Cal Poly. He is a former Marine Corps pilot, and was a NASA project pilot on the Parasev (paraglider research vehicle) program.

Mr. Peterson, a member of the Society of Experimental Test Pilots, lives in Lancaster.

NASA's Office of Advanced Research and Technology is studying the lifting body concept in flight to establish the technological base for design of future manned re-entry vehicles.

In last July's inaugural flight, the M2-F2 was launched at 45,000 feet from beneath the wing of a B-52.

Mr. Thompson, in a series of controlled maneuvers, brought the M2-F2 down to 1200 feet at a descent rate of about two and one-half miles per minute.

Then he flattened out his glide and brought the vehicle to a landing on the Rogers Dry Lake runway at a descent rate of 10 feet per second. The glide took 3 minutes and 37 seconds, from launch to touchdown.

The lifting body obtains aerodynamic stability from its rounded half-cone shape. It offers a means, NASA officials believe, by which pilots returning from space could select a landing site and return to it from a starting point in outer space.

For Sale or Trade

House, 5-room, Spanish stucco on 63 x 130 lot, \$25,000 or trade for residence on same size lot in Fullerton, Brea, Anaheim area. Costa Mesa, OR 1-1254, 714-642-2616. M

Aircraft, 1966 Cessna 150 commuter, 290 hrs. T.T., full paint, hv. duty nose gear, child's seat, gyro panel, ILS, 360 channel radio, 3-lite marker beacon, pitot heat, hr. meter, cost \$10,800, \$8200 or trade 1/3 interest & \$600 dn. Hawthorne, FR 8-6951. M

Acreage, 20 acres near Willow Springs, in Antelope Valley, East Kern Water Agency Dist., \$495 acre, or take late model car as down payment, bal. w/6% interest. Torrance, FR 8-1026. M

Acreage, 10 acres, Calif. land, \$195 acre, \$195 dn., \$19.50 mo. or trade for late model car. No. Hollywood, 983-0437, 875-2873. M

Router, Stanley mod. R2-L w/GA-65A base, \$75; other equipment, various prices or trade for 1 kw. lighting generator, pistol/rifle, 22 cal. shotgun, guitar amp w/tremolo or Go Kart. Box 1803. M

Going my way?

Rides Wanted

7:30 a.m. — 4:12 p.m.

Sepulveda & Main St., Wilmington. Need ride home. Bruce Ball, Mariposa, ext. 4141, TE 4-5191. L

8 a.m. — 4:42 p.m.

Rosecrans & Denker, Gardena. Jodee Parker, Norair, ext. 4720, 323-6538. L

Imperial & Lakewood Blvds., Downey. Morris Brown, Norair, ext. 2042, 861-8508. L

3:42 p.m. — 12:12 a.m.

Crenshaw & 63rd St., Los Angeles. Stan Babinski, Norair, ext. 1825, 751-8487. L

4:42 p.m. — 1:12 a.m.

Chapman Ave. at Harbor or Haster, Garden Grove. Norma Murray, Norair, exts. 2123, 2470, 714-530-4221. L

Rides Offered

4:42 p.m. — 1:12 a.m.

Chapman Ave. at Harbor or Haster, Garden Grove. Norma Murray, Norair, exts. 2123, 2470, 714-530-4221. L

Study of Alloys For High-Strength Castings Begun

Work has started at Northrop Norair which will lead to further development of founding processes and design implementation of premium quality, ultra high strength aluminum castings.

The Northrop contract with the Air Force Research and Technology Materials Laboratory calls for the evaluation of new processing techniques and alloys which show promise of producing premium quality aluminum castings with minimum mechanical properties of 60,000 pounds per square inch ultimate tensile strength, 50,000 pounds per square inch yield strength and 5% elongation.

Three alloys which exhibit the most promising characteristics will be extensively studied so that Northrop Norair data may be used to develop material specifications and design data.

The project is under the direction of K. J. Oswalt, Norair metallurgical engineering. Don Brandt is project administrator.

Apollo Film Earns Magazine Award

"The Last Five Miles Home," a color film produced by Northrop Ventura on the Apollo Earth Landing System, has been honored in the 1966 Industrial Film Awards competition.

The 18-minute movie, produced by Tom Smalley of the Ventura Motion Picture department, has been named "best in class" by Industrial Photography Magazine.

Mr. Smalley, who edited the film, selected the music for it and photographed most of the footage, was notified by the magazine that the movie had won.

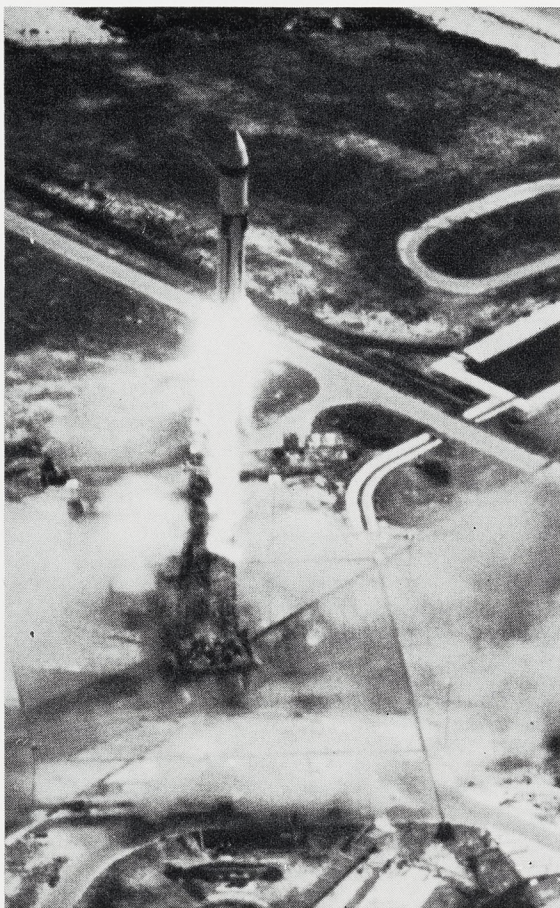
He'll receive an "Indy" statuette on a wall plaque on October 1 at the banquet of the Association of Cinema Laboratories, at the Ambassador Hotel in Los Angeles.

"The Last Five Miles Home" traces the Ventura-built Apollo ELS from fabrication at Ventura to a drop test at El Centro.

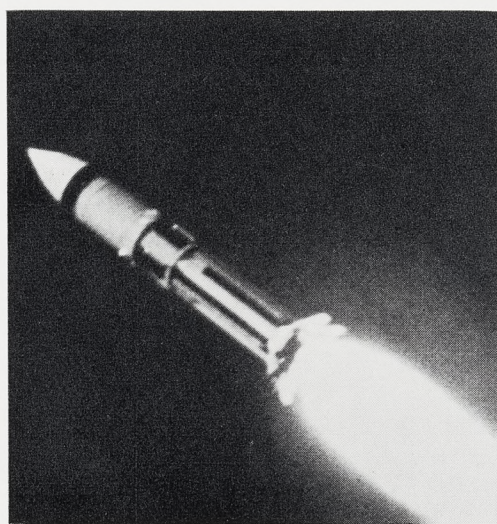
Photographers Bob Thornton and Gill Nunn also took some of the footage, and Henry Still, manager of Public Relations, wrote the script.

The film has been shown in-plant to employees at lunchtime on several occasions.

VIEW FROM 40,000 FEET



ALOTS RECORDS AS-203—Northrop Nortronics' ALOTS (Airborne Lightweight Optical Tracking System) photographs the Apollo-Saturn 203 as it leaves its launching pad at Cape Kennedy. Above, the vehicle clears its tower. In both photos at right, ALOTS uses its 200-inch focal length telescope-camera to record the AS-203 as it passes above 40,000 feet. ALOTS flew at an altitude of 40,000 feet, on a Boeing KC-135.



NORTHROP ROLE CITED

Last Polaris Submarine Launched

A milestone of major significance in modern naval history passed recently with the christening (by Mrs. Hubert H. Humphrey) and launch (at Groton, Connecticut) of the USS Will Rogers.

The Will Rogers is the nation's 41st, and last, nuclear-powered, Polaris-armed submarine.

At the conclusion of outfitting and sea trials the Will Rogers will be commissioned (in 1967) and sent to sea to join the 39 other Polaris submarines now deployed on a world-wide basis as a deterrent force which is unequalled for its survivability.

The U.S. Navy's Fleet Ballistic Missile Program, now approaching its goal of completion with the Will Rogers, was a mere concept less than a decade ago.

Northrop Corporation, along with many other firms and organizations, played a major role

in transforming this concept into actuality, in turning ideas into hardware.

Northrop Nortronics facilities in the East produced star-tracking periscope mechanisms for the Polaris submarines and equilibrium-gyroscope packages for the submarines and their Polaris weapon systems.

But probably best-known among Northrop contributions are automatic checkout systems built at Nortronics Anaheim.

These remarkably versatile and reliable systems have logged more than one million hours of operation with an amazing 99 percent availability factor to date.

Nortronics entered the Fleet Ballistic Missile Program in 1959, the last electronic-producer to receive a major contract. In short order Nortronics became the first to deliver.

Today, Nortronics also operates for the Navy a unique Polaris repair depot where components and systems are cycled for

repair and rework to enhance the latest advancements in the art.

Nortronics operates a logistics and inventory management program for the Polaris fleet, provides field engineering and works to produce and update all types of handbooks and instruction manuals.

And Northrop Nortronics is currently at work on similar services and equipment for use in the United Kingdom Polaris Program.

In the future, the Polaris submarine fleet and supporting facilities will be refitted to accommodate the new Poseidon missile which will have a greater accuracy and flexibility than the current Polaris series.

Nortronics has received a contract to develop and build automatic checkout equipment for use on both land and sea in support of this new weapon system.

Cash Offered For Referral Of New Hires

A \$100 incentive award is being paid to Northrop Ventura employees who refer a plaster pattern maker or a plastic tool and fixture builder for hiring.

A similar award, for \$50, is being paid for employees who refer a plastics fabricator.

Any applicant referred under this plan must be hired on a full-time basis and must remain on the payroll for at least 90 days.

Three recent recipients of the award have been Wilma DiStefano, a \$100 winner for referring associate designer Vivian Butt; Mary Lanning, a \$50 winner for referring plastics fabricator Danny Beltran; and Mr. Beltran, also a \$50 winner for referring plastics fabricator Gene Baca.

Incentive awards can be paid to all employees except corporate and division officers, supervisors of the applicant being employed, department managers, section directors, group chiefs and personnel regularly employed in hiring activities.

The referred applicant must present a referral award card (Form 50-106) at the time of initial contact with Industrial Relations. The cards are available in Room A118 (Administration building).

RESCUE

(Continued from page 1)

"I don't know how she did it," Mr. Holly said. "Clara told me later she would have jumped into the pool if the boy hadn't turned over in time."

Young Paul's parents said there was no doubt the boy would have drowned if Mrs. Holly hadn't pulled him up. "My wife and I are deeply grateful," Mr. Cohn said.

Almost overlooked in the near tragedy was another hero, the Clarks' pet beagle. It was his barking, Mrs. Holly said, that caused her to see the fully-clothed boy fall into the pool.

The life of a Series E United States Savings Bond purchased between May 1941 and May 1949 is 30 years due to the granting of two 10-year extensions. No Series E or H Savings Bond ever sold has stopped earning interest.

RETIREEES TOUR



Fourteen members of the Northrop Recreation Club-sponsored Retirees' Club stand at the entrance to production facilities for the T-38 at Plant 1, at Northrop Norair. The retirees toured Plant 1 last month before their general meeting.

APOLLO

(Continued from page 1)

at the El Centro Test facility over the next six months.

Following the meeting, Mr. Lenhart issued a letter to Ventura's participating personnel, notifying them that no design changes will be required through design review action requests.

Only 12 requests were issued requiring any action, he said, and none of these required changes.

"The presentation and results of our recent Phase II Design Review were truly outstanding in all respects," Mr. Lenhart said, in the letter.

"Every participant can be duly proud of his contribution to the achievement of this major milestone."



A \$50 SMILE—Mary Lanning, a plastics fabricator in Northrop Ventura's Plastic Products branch, accepts a \$50 referral award check from foreman Harry McLaughlin. Mrs. Lanning received the check for the hiring of Danny Beltran, also a plastics fabricator.

NORTHROP NEWS

NORTHROP VENTURA

Published biweekly by Northrop Corporation, Beverly Hills, California

Vol. 24, No. 19

September 28, 1966

Pay Raises For Hourly Employees

A new agreement providing pay increases ranging from 5 to 9 cents per hour has been ratified by members of the Organization of Northrop Employees, Ventura Division, Inc.

The wage increases, which also apply to employees at Ventura's Aero Instrument Facility, were negotiated by Northrop Ventura management and representatives of the O.N.E. They became effective on August 22, and are applicable to all hourly employees except those whose pay rates are already in excess of their current labor grade maximums.

Those employees will receive pay adjustments up to the new maximums of their classifications.

The announcement of the pay increases was made by H. E. Riggins Jr., vice president and assistant general manager.

Technical and office personnel in Labor Grade 1 received an hourly increase of 9 cents. Those in Grades 2 through 5 received an increase of 8 cents.

Grades 6 through 11 were given a 7-cent hourly raise; Grades 12 through 15, 6 cents; and Grades 16 through 19, 5 cents.

Manufacturing and maintenance personnel in Grades 1 through 4 received an 8-cent raise. Personnel in Grades 5 through 10 received a 7-cent hourly raise; Grades 11 through 15, 6 cents; and Grades 16 through 00, 5 cents.

In addition, Mr. Riggins said, the minimum and maximum of the rate ranges have been increased by the annual 5-cent cost-of-living raise granted to all eligible employees on August 15. And a new quarterly cost-of-living adjustment provision was installed.

The new agreement provides for a two-year contract through August 18, 1968. Wage adjustments may be made effective August 7, 1967, if agreed upon before August 3, 1967.

'I REMEMBER MAMA'

Conejo Players in New Production

The Conejo Players, a little-theater group which performs in Thousand Oaks, might almost as accurately be called the Northrop Ventura Players.

For example, in the group's current production, "I Remember Mama," the title role is played by Dorothy Dumond, wife of Lou Dumond of the Estimating branch. Both are members of the Players.

One of the child leads in "Mama," is played by 12-year-old Marianne Murry, daughter of test engineer Warren Murry. Mr. Murry is executive producer of the Players, and assistant stage manager for this production.

His wife, Jeanne, also an active member, is in charge of

the snack bar for "Mama."

Al Martin of Quality Control plays Doctor Johnson in the turn-of-the-century production, and Denise Rowlett, daughter of Bob Rowlett of the Apollo Program office, is Madeline.

Bob Peterson of Quality Control is assistant director,

(Photos on page 6)

and his wife, Karen, is business manager.

Sue Henderson, head usherette for this production, has acted in previous presentations. She's the daughter of Milt Henderson of Ventura's Contracts branch.

Alex Caria and Virginia Alfont, both from the Nortronics

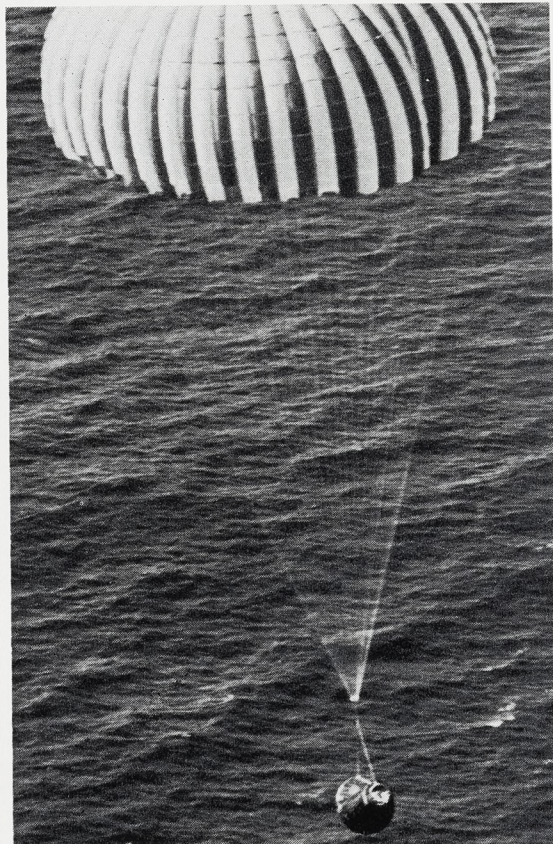
Applied Research department (NARD) in Newbury Park, are active in the group but not in "Mama." Mr. Caria was in "Finian's Rainbow," a recent Players' production.

Active in the group until their transfer to the Northrop Space Laboratories Huntsville department were Jerry Webster of Northrop Ventura and his wife, Lee.

"I Remember Mama" opened last weekend and will be presented each Thursday, Friday and Saturday until October 15. Curtain time is 8:30, and tickets may be obtained by calling 495-3715.

The Players perform in the Conejo Playhouse in Thousand Oaks.

SUCCESSFUL MISSION



Seconds before touchdown, the Gemini 11 capsule floats gently toward the Atlantic beneath the Northrop Ventura parachute landing system. At right, Astronauts Charles Conrad and Richard Gordon have a Navy helicopter on the



deck of the USS Guam recovery ship following a successful three-day flight. As it has on every occasion the Northrop Ventura-built parachute system performed flawlessly (story on page 4). Photos by NASA

Sales, Backlog, Earnings Set New Highs in Fiscal '66

Northrop Corporation recorded all-time highs in sales, earnings and backlog for the fiscal year ended July 31, 1966, President Thomas V. Jones announced earlier this month.

Per share earnings, also the highest in the company's history, were \$2.49 on 4,206,500 shares outstanding at July 31, compared with \$2.10 on the 4,126,000 shares outstanding at the end of the previous fiscal year.

Consolidated net income was \$10,474,000 and consolidated sales were \$357,270,000. Last year Northrop earnings amounted to \$8,683,000, and consolidated sales totaled \$339,324,000.

The backlog of firm and programmed work at the year end

stood at \$574,000,000, almost double the \$288,000,000 backlog of a year earlier.

"We expect the current year to show significant improvement in volume of sales and continuation in the trend of higher earnings," Mr. Jones stated.

"Our backlog at the end of the year indicates both growth and diversification," Mr. Jones said. "For example, it includes \$67,000,000 in communications systems, \$88,000,000 in electronics, \$178,000,000 in military aircraft, and \$152,000,000 in airframe sections for commercial airliners.

"In this latter area, \$110,000,000 of the backlog represents an initial firm contract from Boeing for design and construction of major fuselage sections for the first 50 of the Model 747 aircraft (See EARNINGS, page 6)

NVRC Hosts 1000 At Annual Picnic

A clear day and temperatures in the mid-70's greeted more than 1000 Northrop Ventura employees and their families Saturday at the annual Ventura Employees' Picnic at Vasa Park in Agoura.

The emphasis was on youth, as employees' children were entertained by numerous clowns, monkey acts, a puppet show, several rides, contests and games.

Johnnie Via, NVRC council president, said the picnic was one of the most successful in the Division's history.

Because of printing deadlines, photographs could not be published in this issue. However, complete photo coverage will be forthcoming in the next issue of the Northrop News.

S. American Drones Near Completion

Northrop Ventura is presently completing contracts totaling nearly half a million dollars to provide drone aircraft and related equipment to two South American nations.

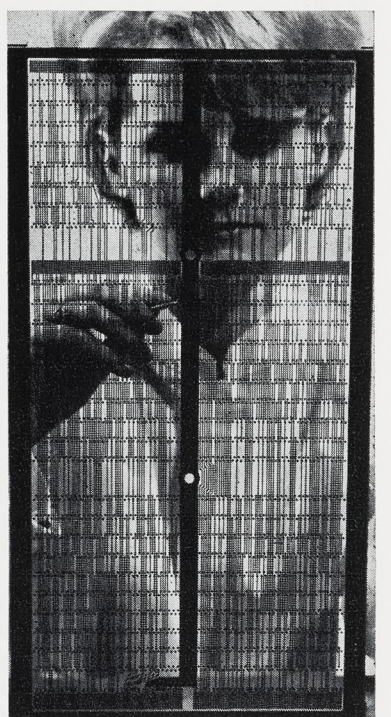
The contracts are with the governments of Brazil and Argentina. Both call for delivery of KD2R-5 unmanned radio-controlled aircraft which have been in standard use as aerial targets for a number of years throughout the Free World for anti-aircraft gunnery and missile training.

"These orders represent Northrop Ventura's first direct sale in the South American market," according to Stiles Burke, head of International Marketing for the Division. "We are mounting a considerable campaign to expand our overseas sales of drones and other equipment to these and other South American nations."

International sales, principally to allied nations in Europe and Asia, have contributed approximately \$2.5 million annually in recent years to Northrop Ventura's volume of business. Strong efforts are being made to expand this market, principally through sale of drones, for target and reconnaissance use, landing systems for space vehicles and aerial cargo delivery.

Both the new South American orders call for manufacture and delivery of drone aircraft along with ground support equipment, spares and field technical support.

The KD2R-5 is a propeller-driven drone 13 feet long with an 11-foot wing span. It is capable of flying for an hour by remote radio control at 200 mph and altitudes up to 23,000 feet. This drone has been used extensively by the U.S. Army and Navy and 15 other nations.



Microelectronic circuit technology in Northrop 1051 computer is similar to that being developed for C-5A navigation system at Nortronics Hawthorne. Above is glass master which permits photographic transfer of etched circuit pattern into logic section carrier boards of the lightweight, low-cost computer.

GHOSTS ON THE WATER

NRC Sea Scouts Win Trophies

Final standings for the Santa Monica Evening Outlook Trophy Yacht Race held over the Labor Day weekend showed a Northrop Norair family dominated one class.

George Larsen and his 11-year-old son, Andy, took first. Dan Larsen, another son, finished second.

The fact the Larsens did so well in the seven-mile race is noteworthy, but not unusual, since their name is more or less synonymous with the class and the boat that sails it—both known as Ghost.

Behind this and similar victories along the Southern California coastline is a sort of Horatio Alger tale of the yachting world. It led to establishment of this particular class in most yacht races.

Mr. Larsen is a Northrop Norair senior research engineer

in Manufacturing Research and Development. He is also NRC commissioner for Scouting. Dan Larsen, a college student, is First Mate of the NRC-sponsored Sea Scout ship "Seagull." He serves under Skipper Kenneth Van Wig.

About eight years ago the Larsens noted a lack of interest in some "Seagull" activities. So they designed a special mold from which 13-foot sailing sloops could be fashioned and suggested the youngsters utilize it to build boats for the group and even for their own, if they liked.

The idea caught on and the Larsen garage became a busy place. Young men worked there fashioning fiberglass hulls, centerboards and other components and elsewhere in machining parts, welding, soldering, shaping masts and even making sails.

For approximately \$200 and a lot of steady work, the youths could have their own completely outfitted sailing sloop. It had a five-foot beam and a six-inch draft (with the board up), plus a sail area of 105 square feet in a main and jib sail.

More, it was practically in-

destructible and could be righted without even getting wet. It weighed a mere 150 pounds, making it easy to fit atop an automobile or on almost any type of trailer.

The boys were free with their time and with the Larsen's help aided other Sea Scouts in building boats for their units.

Soon the sleek fiberglass speedsters began to appear on bays and in the ocean. They were able to go anywhere in good weather and sailed up and down the coast on longer and longer cruises. They were carted inland and sailed the larger waterways throughout the state, in Canada and Mexico.

About this time the little craft got their first name. Because "Seagull" members liked to invite their sistership Girl Scout Mariner group, called the "Sea Maids," for special cruises, the boats became known as "Romeos," a name that stuck until the Ghost terminology was deemed more applicable.

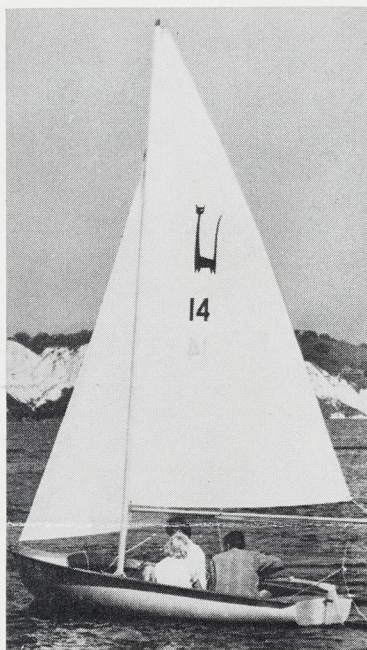
The Southern California Yacht Association granted the Sea Scouts special memberships which enabled them to race in most yacht events. Often sailing with inexperienced crews, the little speedsters would sometimes sail through whole fleets of larger, better-equipped yachts to post especially good times in events. From this grew the special Ghost class in which they now race.

Naturally, Sea Scouts have come and gone in the eight years and many have taken their boats with them, which adds to the caliber of skippers (See GHOSTS, page 5)

Disneyland Tickets Still Available

Northrop Corporation ticket outlets are still offering tickets to a special Association of the United States Army "Night at Disneyland" set for October 28.

Tickets sell for \$3.75 and are good for all attractions and rides on an unlimited basis between the hours of 8 p.m. and 1 a.m. Northrop employees are special guests of AUSA for this event.



Entry in a Ghost class race still bears "Romeo" emblem on its sail.



Wade Tilley contemplates narrow escape from golf ball.

NRC 'Buys House' For Screen Epic

"Hawaii," the epic motion picture based on James A. Michener's greatest novel, will be shown exclusively to Northrop families and their friends October 25 through special arrangements of all NRC Councils.

Scheduled for 8:30 p.m. at the Egyptian Theatre, Hollywood, the showing is a featured pre-release premiere open only to select sponsors before the film is available for public viewing.

By "buying the house," all 1318 seats, NRC can bring this attraction to Northrop families and at the same time offer discount prices for reserved seats.

Regular \$3.50 seats will be available for \$2.80; \$3 seats for \$2.40; and \$2.80 seats for \$2.20. Tickets may now be obtained through Northrop ticket outlets.

Julie Andrews, Max Von Sydow and Richard Harris star in this film classic.

SAFETY KNOWLEDGE SAVES EYE FROM GOLF BALL PERIL

Wade Tilley, a member of the Apollo staff at Northrop Ventura, came within about 30 seconds of losing his left eye recently—and it was his knowledge of safety which saved the eye.

Mr. Tilley, a weekend golfer, had just taken a badly cut golf ball from his 13-year-old son, Bill, who had accidentally run over the ball while mowing the family's lawn.

"I was telling Bill and my wife about how dangerous the caustic liquid in the center of a golf ball can be," Mr. Tilley said, "when the ball burst open, and the liquid squirted into my eye like a hydraulic explosion."

The force was so great, Mr. Tilley said, that the liquid which did not hit his eye and face squirted all the way to the ceiling.

"I've worked with acids before," Mr. Tilley said, "so I knew what to do. I ran to the sink and rinsed the eye with clear water while my wife called the Conejo medical clinic to alert them that we were coming."

Mr. Tilley said the doctor told him that he would have been permanently blinded in the left eye had he not washed the liquid from it as soon as he did.

"Those things contain a mixture of liquid rubber and acetone," Mr. Tilley said, "and acetone will even burn normal skin."

There was no permanent damage to the eye, Mr. Tilley said.

"I was just trying to tell them how dangerous a liquid center golf ball could be when cut," he said, "but I didn't mean to show them."

'WOULDN'T TRADE WITH A KING'

With Classic German Sailplane, Kern Nears Gold Badge

"It's just you and God and the wind." That's how George Kern, Norair Systems Reliability supervisor, describes soaring, an interest he has held for more than 20 years.

Soaring, or gliding, as it used to be called, is not a new sport. It predated powered aircraft flight by a half-century. Its popularity in the United States is centered in California, New York and Texas, but its greatest following is still in Europe, where the sport was born.

England, Germany, Poland and the Soviet Union especially have more than their share of enthusiasts, and many sailplanes in use in the United States are imported from Germany, England or Poland. Many, of course, are from American manufacturers or are home-built.

Mr. Kern was introduced to soaring in Elmira, New York, in 1946, but never piloted a sailplane until two years ago, when he joined the Flight group of the Southern California Soaring Association in Los Angeles. Since then, he received his private glider pilot's license, and last year, after seeing an advertisement in Soaring Magazine, he entered into the sport in a full-scale manner.

The advertisement offered for sale a Minimoo, a classic among sailplanes, which was the last one built before World War II by Schempp-Hirth in Germany for Wolf Hirth's personal use. Mr. Hirth was the designer of the Minimoo and was to soaring what Babe Ruth was to baseball.

He lost his right leg in a motorcycle accident in 1926, and accomplished

most of his soaring feats after that. During World War II, the Hirth Minimoo was hidden in a shed deep in the Black Forest, as Mr. Hirth feared it might be appropriated by the military for training purposes.

After a life devoted to advancing the technology and sport of soaring, Wolf Hirth died three years ago.

Answering the advertisement, Mr. Kern contacted the owner, Mr. Klaus Rudolph, in Rendsburg, Germany, and went to Europe in February to buy the 27-year-old craft.

The purchase brought into this country one of the only two known Minimoo's still flying in the world. The other, in Fort Worth, Texas, was brought to the United States in 1936 aboard the Graf Zeppelin, to compete in the 1936 world soaring championships. It since has been owned and flown by several top U.S. soaring personalities.

"I didn't have a chance to fly it until August," Mr. Kern said, "when I took it to Crystallaire, a gliderport near Pearblossom."

Because of the favorable atmospheric

conditions existing in the area, and the unequalled expanses of flat, unpopulated land, the California desert is one of the country's most popular soaring centers.

Crystallaire is 20 miles from Palm-dale, at the edge of the Mojave Desert, just north of the Angeles Crest Mountain range.

Wolf Hirth's plane was in good structural condition when it arrived in the United States, but needed to be completely refinished and equipped with instruments. Mr. Kern installed the instruments and finished the ship in ivory enamel, leaving the original tail markings untouched.

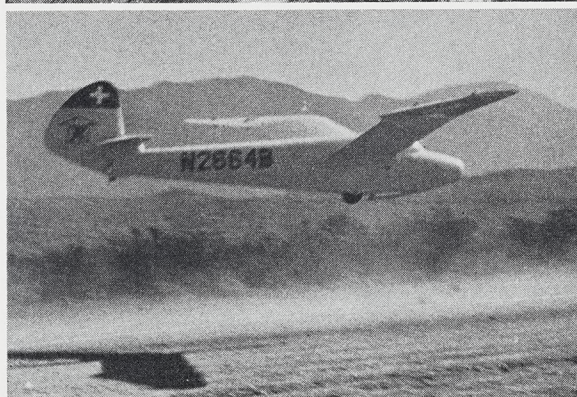
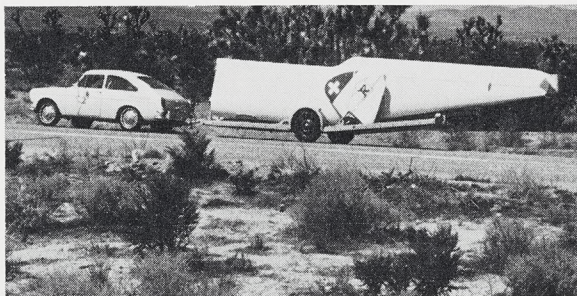
The plane has a wing span of 56 feet, weighs 572 pounds empty and about 750 pounds in flight, and is of all wood construction. It has a full monocoque fuselage and plywood and fabric-covered wings and tail surfaces.

The high, gull wing design was a notable characteristic of Wolf Hirth's designs.

"Soaring is not a daredevil sport," Mr. Kern said. "It's far safer than sky diving, auto racing or many other popular sports."

A pamphlet published by the Soaring Society of America (SSA) says soaring "bears the same relationship to powered flying that sailing does to power boating. A soaring pilot . . . flying . . . entirely by his knowledge of the air . . . would not change places with any king in history."

Mr. Kern agrees. He has flown many types of powered aircraft, but prefers (See SOARING, page 3)



George Kern shown going and coming (left photos) and in his sailplane cockpit (above).



The bronzelike statue in this pool is done in fiberglass by sculptor Bill Maloney of Redondo Beach. The pool is in front of the Nortronics Palos Verdes Administration building, site of a two-day art show next month. Mr. Maloney will be one of several sculptors, whose work will be on display.

STATE OF THE ART SHOW

Jewelry, Stoneware, Furniture, Oils . . .



Virginia MacSparran serves refreshments (above) to press preview showing earlier this month. Bill Martin (below) shows Sally McAller a display of his hand-wrought silver jewelry.

Art, from jewelry making to furniture design and from stoneware to oils, will be on display at Nortronics Palos Verdes soon in the Palos Verdes Community Arts Association's third annual show.

More than 100 of Southern California's top amateur and professional artists and craftsmen have accepted invitations to display their work. The show will be held from 11 a.m. to 6 p.m. October 15 and 16 on the lawns and parking areas of the Palos Verdes facilities.

A dinner will be held on the patio of the Administration building.

Recently, the Association held a press preview, at which many of the artists gave photographers an advance look at their exhibits.

Many of the pottery makers will demonstrate use of the potter's wheel.

A special section will highlight children's art, and the NRC Art Club will have a display.

Many of the works shown

will be for sale.

The first show sponsored by the group was held in Portuguese Bend. The second was in Palos Verdes Estates.

President of the group is Mrs. Tom Carvey of Palos Verdes Estates.

Lyn Sims of Palos Verdes Estates and Sally McAller of Rolling Hills Estates are co-chairmen for the show.

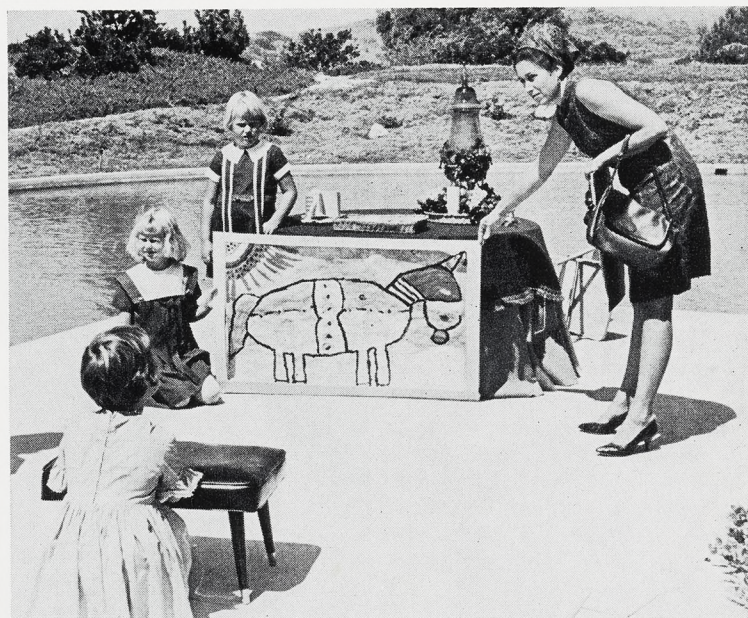
1967 European Tour Reservations Opened

Northrop Recreation Clubs are combining their efforts to stage a European group tour next year, departing May 18 and returning June 7, via Air France jet.

Air fare will be \$325. Optional are tours of Southern Europe (for \$350) or the Scandinavian countries (for \$375).

Reservations are now being taken at Northrop Personnel Activities office where preliminary itineraries may be obtained.

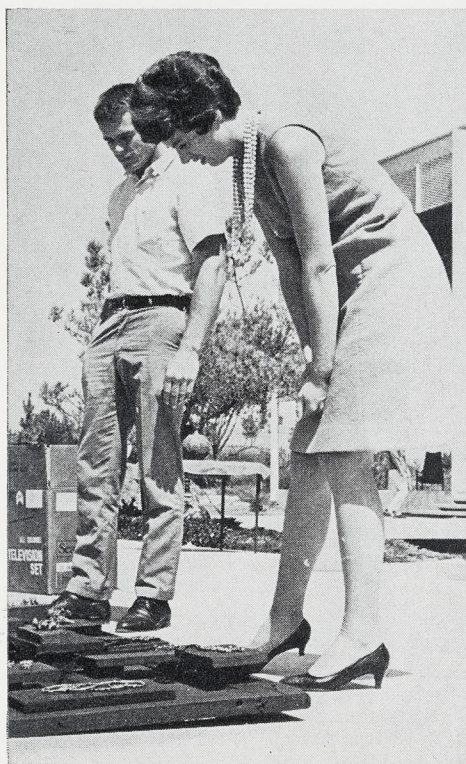
Randy Lee of Nortronics Anaheim is the coordinator.



Mrs. Lyn Sims (above), a co-chairman of the Palos Verdes Community Arts Association annual show, looks at paintings by children of Mr. and Mrs. Don Hollingshead. Frank Matranga (below) will give demonstration on potter's wheel at the October 15 and 16 show on grounds of Northrop's Palos Verdes Research Park.



Several artists with their works pose for photographers.



SOARING: Just You and God and the Wind

(Continued from page 2)

soaring to any other type of flight.

In the small cockpit of a sailplane, the only instruments are an air speed indicator, altimeter, compass, variometer (which is an extremely sensitive instrument which detects rising or falling air currents), rate-of-climb indicator, vertical accelerometer and clock.

Flight controls are similar to those in standard aircraft, since the soaring pilot's need to maneuver is the same as that of a powered aircraft pilot. In addition to the rudder, elevator, and aileron controls, most sailplanes are equipped with spoilers and/or dive brakes, which permit them to land in extremely short fields.

Meteorological knowledge applied to the sport, Mr. Kern said, has enabled pilots to ride "thermals," warm columns of air which rise from the ground, for many hours, generally by circling within the column.

Thermals are the result of unequal heating on the earth's surface from the sun. The top of a thermal, usually marked by a cumulus cloud, may be as high as 20,000 feet or more above the ground.

On September 4, flying from El Mirage in the Mojave, Mr. Kern completed two of the three requirements for a gold badge, one of the highest awards given in soaring.

He was in the air for 5 hours and 40 minutes; 40 minutes longer than required. His top altitude of 15,220 feet above sea level was 11,320 feet above the low point of his flight (an altitude gain of 9843 feet is necessary for qualification).

Soon he expects to complete the final requirement, flying 195 miles from Crystallaire to Las Vegas (minimum cross-country qualification is 187 miles—300 kilometers—to a predetermined destination).

Badges are awarded by the Federa-

tion Aeronautique Internationale.

Sailplanes may be launched by a ground-mounted power winch, by a car towing the plane down the field, or in tow from an airplane.

Advantages of an airplane tow, Mr. Kern said, are a higher release altitude and the ability to fly toward an area of favorable lifting conditions, instead of being limited to launching in the area adjoining the launch site.

Mr. Kern, a Norair employee for four years, is a director of the Southern California Soaring Association, which is affiliated with the SSA. He also is the manager of the SCSA Flight Group, which trains newcomers to the sport and hopes to give a start in soaring to those who may someday be on the U.S. team in the World Soaring Championships.

Mr. Kern plans to make soaring a 12-month hobby, even though the summer months are best because of the warmer air conditions.

The Kerns live in Inglewood.

FOR BOEING 747 AIRFRAME

Training Program Graduates Designers

Twenty-three Northrop Corporation student employees received graduation certificates earlier this month in recognition of their capability to become members of Norair's design organization.

Certificates for the unusual company-sponsored course were presented by Warren Klauer, Norair's project director, Boeing 747 Technical Program, following an address by Ken Strite, dean of the Northrop Institute of Technology Engineering School.

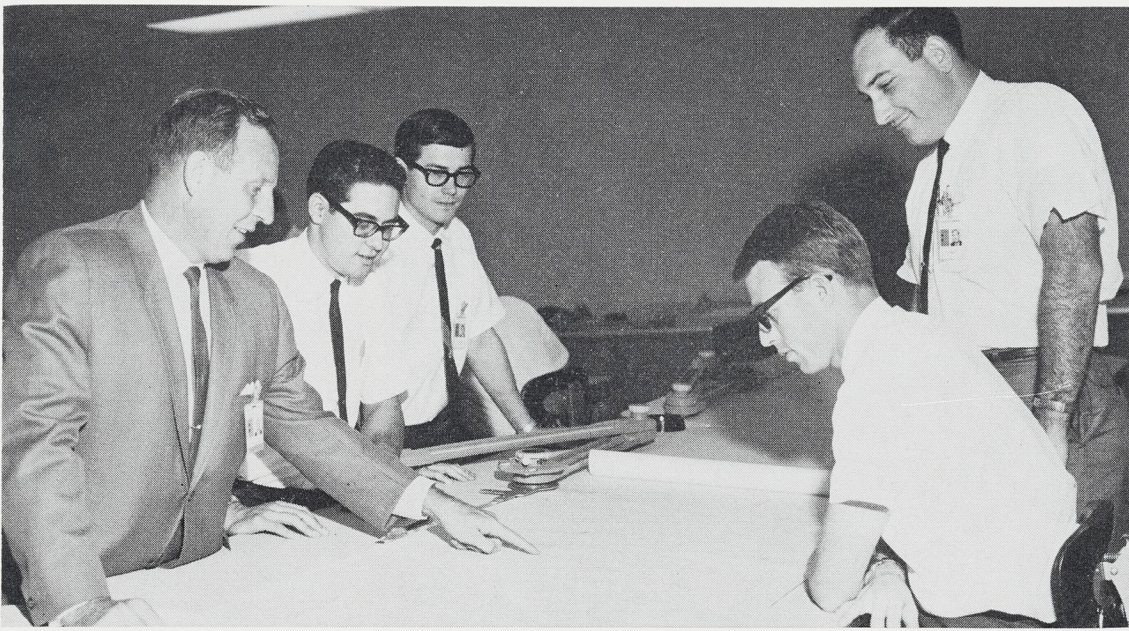
The new airframe designers have successfully completed a 320-hour college-level training course given by the Northrop Institute of Technology under contract to Norair's Personnel Development and Training group.

Graduates had previously completed a portion of their academic engineering training or had been practicing design engineers in other industries to qualify for entry in the Norair sponsored course of instruction. Norair has scheduled another class for potential design engineers to begin on October 10. Students accepted for training are hired as "designers in training" and remain in that classification until course completion, when they are reassigned to their work organization.

According to Mr. Klauer, "a critical shortage of airframe and aerospace equipment designers exists in Southern California. This method of training basically qualified people is one of the few ways for Norair to hire this needed skill for our future Boeing 747 production program."

All of the graduate airframe designers of the Northrop course will be assigned to his department.

Northrop will continue to conduct training courses to provide personnel resources in critical hard core engineering specialties. Most personnel increases are attributed to preparation for production of the 150 foot long fuselage for The Boeing Company. A new transport production facility for that purpose is under construction at the Hawthorne plant.



TAKE IT FROM HERE—Warren Klauer (left), Norair project director, Boeing 747 Technical Program helps (from left) Jerry Manzanares, Michael Keith, Kenneth Hirsch and Stanley Ossoff get started on technical problem. The men are

part of a group of 23 student employees who recently graduated from 320-hour, college-level training program for airframe designers. All are on the joint 747 Program staff under Mr. Klauer.

'LEADERSHIP THAT LEADS'

Managers to Hear Famed Consultant

"Leadership That Leads."

That's the topic of a speech to be delivered next week by Dr. Kenneth McFarland, appearing before a joint meeting of the Northrop Nortronics and Northrop Ventura Management Clubs.



Dr. McFarland

served at 7:30.

Dr. McFarland, author of the book "Eloquence in Public Speaking," has been a guest lecturer and corporation consultant for 20 years. One biographer has called him "the home run king of the speaking world," and another said he is "the nation's most eloquent speaker on the American System. His speeches reflect a pleasing blend of solid experience, sound scholarship, practical idealism and good hu-

mor."

The meeting is the sixth and final one in a series of Northrop Ventura Management Club-sponsored lectures

Millions Watch Northrop Chutes Land Gemini II

Millions of Americans on September 15 were treated to a ringside television view of Northrop Ventura's Gemini parachute landing system when Astronauts Charles Conrad and Richard Gordon returned from their three-day flight in space.

At the conclusion of probably the most nearly perfect flight in the Gemini series, the GT-11 spacecraft floated gently to a landing in the Atlantic, less than two miles from the USS Guam recovery aircraft carrier.

Cameramen aboard the ship picked up the descending 84-foot parachute moments after it opened and followed it all the way down to splashdown about 700 miles east of Cape Kennedy.

Clearly visible on television were the main parachute, the pilot parachute carrying the rendezvous and recovery canister, and the bridling sequence as the astronauts shifted from vertical to near horizontal position.

During their more than 70 hours and 44 revolutions aloft, Astronauts Conrad and Gordon established several space records. These included rendezvous and docking with an Agena target satellite during their first revolution, an altitude record of more than 850 miles, and tethering of two vehicles, their spacecraft and the Agena target.

At the conclusion of the flight, Dr. Robert Gilruth, administrator of NASA Manned Spacecraft Center, Houston, congratulated the NASA, Defense Department and industry teams on the excellent flight. "The performance of everyone was flawless," Dr. Gilruth said.

Gemini 12, the final in the nation's Gemini program, is tentatively scheduled to occur within the next two months.

on "Communications in Management."

The event is open to Management Club members, their wives, and outside guests.

Reservations may be made by contacting Harvey Cook, Norair Ext. 1353; Richard De Fussi, Nortronics Hawthorne Ext. 538; Don Archer, Ventura Ext. 429; or Ben Kapp, Ventura Ext. 669.

In other Management Club activities, Ventura president Bill Young has announced that the group's annual dinner-dance will be held at the Las Posas Country Club in Camarillo on December 3.

Fashion Show

Tickets will be available early next month for the October 22 NRC (Anaheim) Women's Club's "Artistry in Fashion" show to be staged at the beautiful Los Coyotes Country Club.

HAMILTON HEADS NEW CORPORATE ORDNANCE POST

Appointment of Douglass W. Hamilton to the newly-created position of Corporate manager of Ordnance Plans and Programs for Northrop Corporation has been announced by Glenn R. Lord, Northrop vice president of marketing.

Mr. Hamilton will be responsible for planning and integrating Northrop's unified ordnance marketing program.



Mr. Hamilton

Mr. Hamilton has been a member of the Northrop marketing organization for 15 years. Prior to joining the company he served in the U.S. Air Force as a command bomber pilot and as a test pilot.

Assisting Mr. Hamilton in his new assignment will be four regional representatives. They are David A. De Lo, eastern regional operations, Washington, D.C.; Kenneth Snelling, western regional operations, San Bernardino, California; William Boggess, southeast regional operations, Eglin AFB, Florida; and Anthony Demetriou, central regional operations, Asheville, North Carolina.

235 Pints of Blood Given at Hawthorne

First and second shift personnel manning Hawthorne operations donated 235 pints of blood September 8 in support of the program to replenish blood supplies in Vietnam.

Northrop Corporation personnel have now given 635 pints in this nationwide effort staged in response to an appeal from the Department of Defense for assistance. At the same time Northrop's credit with local blood banks has been increased accordingly.

Next scheduled bloodmobile visit for the Hawthorne area is now scheduled for December 1.

JEANNE CAME THROUGH



Before this Northrop around-the-world tour group departed, NRC Commissioner Jeanne Andrecht suggested a pre-departure picture. NORTHROP NEWS editors countered with a suggestion picture be taken in a more appropriate setting. So here are the travelers, including Jeanne, before India's famed Taj Mahal just before they departed for Iran on a tour they described as "wonderful."

YOUR DOLLARS AT WORK



Five Northrop employees recently visited the Orthopaedic Hospital in Los Angeles for a graphic demonstration of how AID-United Givers funds, like those contributed by Northrop employees, are put to work. A vivacious little patient named Charlene reacts to visit by Rochelle Kraus and Frank Macias. Annual AID-United Givers and NORaid drive opens at Northrop next month.

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

For Sale

Willis Jeep, 1962, CJ5, 10,000 miles, new top, elec. wipers, & new paint, locking hubs, other extras, \$1500. Gardena, 324-7442. A

TV, Magnavox, 19" portable, walnut case w/stand, 2 yrs. old, \$75. Torrance, 327-8226. A

Impala, 1958 sport coupe, 345 cu. in. w/3 3-bbl. carbs., chrome reverse rims, \$700. Lynwood, 632-2632. A

Dresser, walnut, headboard, \$18. Hawthorne, OS 6-3410. A

Volkswagen 1300, 1966, 5900 miles, w/w tires, \$1675. P. V. Pen., 377-7555. A

Dishwasher, 1966 GE portable, \$115. W.L.A., 277-2549. A

Outboard Motor, 1961 Mercury, all elec., 60 h.p., \$350. Hawthorne, 676-7109. A

Piano, upright, \$150. L.A., 757-3595. A

Volkswagen, 1965, \$1500. Torrance, DA 5-7154. A

Kittens, 2 male Siamese, 1 blue & 1 seal-point, \$15 ea. Lawndale, 371-3919. A

Honda, 1965, 250 Scrambler, large jets, \$500. Inglewood, 676-8982. A

Lot, R-2 in Palm Springs Panorama, \$5000. Torrance, 370-4641. A

Transmission for 1965 Volkswagen, 4-sp., all synchro, \$125. Port. Bend, 377-2921. A

Kitchen Chairs, 4, Early American, need reupholstering, \$6. Torrance, 371-1096. A

Life Raft, inflating cylinder or manual, \$150. Redondo Bch., FR 9-1804. A

Playpen, Babyline, \$5. Inglewood, 674-6395. A

Rods & reels, 2 12' custom surf, in sets only, many other combs., \$35. Torrance, 371-9925. A

Skis, metal, Fisher Alu Reisen-Slalom, length, 195 cm., Marker Toe bindings, Marker turntable, long thong, used 1 yr. \$105. P.V. Pen., FR 7-3888. A

Lawn Mower, power, reel-type, auto-rewind, \$25. Torrance, 375-6467. A

Falcon, 1963, Ranchero, r/h, 6-cyl. auto., \$800. Burbank, 644-1016. A

Washer, Westinghouse, hvy-duty, front load, 18 mos. old, \$100. Hawthorne, 675-7928. A

Relax-A-Sizer, used once, cost \$300; \$225. Torrance, 370-0239. A

Mustang, 1965, 3-sp. trans., stereo tape unit, \$1600. Inglewood, 672-1010. A

Ford, 1962, 9-pass. Country Sedan, all extras, 45,000 miles, \$950. Manhattan Bch., 376-9970. A

Home, 3-bdrm., newly decorated, dble. detached gar., covered patio & car port, cpts., dps., awnings, fenced yard, will take small down or mobile home for equity, balance on G.I. loan at 5 1/4%, \$23,600. Long Bch., 429-4349. A

Desk Lamp, twin fluorescent bulbs, completely adjustable, spring loaded, made in Norway, cost \$30; \$10. Marina del Rey, 823-2655. A

Box Spring, mattress, twin size, extra firm, \$20. Redondo Bch., FR 2-3827. A

Chevrolet Impala, super sport, full power, 327 V-8, air, \$1595. Manhattan Bch., FR 6-5192. A

Mobile Home, 10'x40' Biltmore, 1964, parked near Northrop, \$3000. Gardena, 327-2698. A

Golf Clubs, left-handed, 2-9 irons, 1, 2, 3 woods, \$35. Torrance, 324-9193. A

Dining Set, 8-pc. Mediterranean, table w/2 leaves, seats 12, 6 chairs recently upholstered, rose velour, buffet, \$450. Torrance, 326-4379. A

Changer, Garrard type A, w/Shure M3D cartridge & walnut base, also plastic cover, \$45. Westchester, OR 2-4828. A

Furniture, love seat & his & hers chairs, antique w/original covering, rust colored, \$275. Inglewood, 673-1133. A

Porsche, 1965 SC coupe, AM/FM Blaupunkt, tuned exhaust, \$3950. Lancaster, WH 8-4103. A

Movie Camera, 8mm Mansfield Holiday auto. zoom lens, pistol grip, leather case, tripod in case, used 3 times, \$60. Lynwood, 638-3423. A

Volkswagen, 1964, metal sunroof, push-out rear window, orig. owner, \$1295. Torrance, 755-8153. A

Cadillac, 1956 coupe de ville, all power, very low mileage, new paint, good tires, \$495. Rolling Hills, FR 7-3487. A

Corvair, 1962 Monza, 4-sp. trans., 1-owner, \$750. Orange, 714-637-5855. A

Home, 2-bdrm., stucco, dble. detached gar., carpeting throughout, dps., dishmaster, garb. disp., sprinklers, close to Hawthorne schools, & shopping area, \$22,500. Hawthorne, OS 6-5622. A

Surfboard, Hobie, fiberglass over Balsa wood, wt. 30 lbs., 22"x9'9", \$80. Gardena, DA 4-2230. A

House, Torrance, 3-bdrm., 2 baths, lge. covered patio, bitins, w/w cpts., 5 1/4% mortgage, \$141 mo. pymts., \$27,500. P. V. Pen., 377-9666. A

Pontiac, 1964 Star Chief, 4-dr., auto. trans., r/h, p/s, orig. owner, 31,000 miles, \$1700. Lawndale, 370-3821. A

Dishwasher, portable auto., General Electric, under guarantee, \$180. Yorba Linda, 714-528-9227. A

Lot, 80'x100', at Snow Summit, Big Bear Lake, 1 block from ski lift, financing avail., utilities avail. at lot, \$6950. Fullerton, 525-1677. A

For Sale

House, 4 lge. bdrms., 1 1/4 baths, family rm., fireplace, cpts., dps., bitins, approx. 2100 sq. ft., pool, sell FHA, \$27,500. Orange, 714-637-7410. A

Sewing Machine, Kenmore portable, \$15. Inglewood, 755-1071. A

Buick, 1962 Skylark convt., p/s, p/b, p/top, \$1095. Somis, 805-482-1186. A

Baby Furniture, crib, mattress, mesh play pen, stroller, car seat, hi-chair, jumper, infant seat, \$50. Manhattan Bch., FR 4-4780. A

Aquarium, 5-gal. w/filter & motor, 30 guppies, \$5. Torrance, 370-6734. A

Cadillac, 1949, r/h, 51,000 act. miles, good tires, \$80. Hawthorne, 676-2803. A

Studebaker, 1959, \$50. Gardena, 532-5086. A

Camping Trailer, Shasta 13', sleeps 5, butane-stove w/oven, 50 lb. ice box, awning & extras, \$575. Redondo Bch., 375-4646. A

Encyclopedia, Standard, incl. medical dictionary & set of classics, orig. cost, \$400; \$275. Torrance, 370-9672. A

Station Wagon, 1958 Mercury, 430 cu. in. V8, \$125. Hawthorne, 644-3487. A

Pontiac, 1963, LeMans convt., new tires & trans., \$1100. Glendale, 244-7493. A

Darkroom Equipment, photographic, 2 1/4x3 1/4 enlarger w/distortion control, montage masks, printer, developing tanks, timer & access., \$175. Miraleste, 831-5615. A

Pontiac, 1955 2-dr., \$100. L.A., 275-9441. A

Oldsmobile, 1961, Super 88 Holiday, fully auto., 4 dr. h/top, \$895. Torrance, 329-6748. A

Silverware, silverplate, setting for 8, w/case, \$9.90. Hawthorne, 676-0418. A

Willis, jeep station wagon, 1952, 400 miles on rebilt. eng. & trans., rebushed front end, \$145. L.A., 472-3374. A

Ford, 1956, new rebuilt auto. trans. & carburetor, \$100. L.A., PL 4-1628. A

Chevrolet, 1960 2-dr., stick shift, 348 cu. in. eng., new brakes, tires, battery, shocks, ball joints, \$800. L.A., 670-5084. A

Parachute, 28' orange & white, modified to double T w/harness, also 24' camouflage reserve chute, \$55. Inglewood, OR 7-8301. A

Desk, maple, \$20. L.A., AX 4-0727. A

Dryer, 1954 Kenmore, 220 volt, used 8 mos., \$70. Hawthorne, 676-3548, OS 5-4380. A

Bed, dble., box spring & Simmons mattress, \$40. P.V. Pen., 377-6648. A

Sailboat, 1941 Weber, 20' L.O.A., 7' beam, sleeps 2, 3.5' draft, galley, 170' sail area, main & working jib, 20 h.p. inbd. eng., 7/8" mahogany planked hull, \$1850. Hermosa Bch., 374-0548. A

Motorcycle, 1965 Harley Davidson M-50, 50 cc eng., over 100 mpg, 2700 miles, \$135. Culver City, 398-3949. A

Sailboat, 10' fiberglass Elgin w/dacron sail & trailer, \$250. Long Bch. GA 7-4197. A

Mercury, 1963 Monterey, 4-dr. h/top, p/s, p/b, r/h, factory air cond., \$1550. Gardena, DA 9-1652. A

Ford, 1957, 2-dr. Victoria, r/h, p/s, new trans. & starter, needs eng. work, \$150. L.A., PL 6-2314. A

Lawn Edger, elec. Silex, \$10. Culver City, VE 9-5438. A

Lamp, adjustable heat & sun, \$150. Redondo Bch., 379-1049. A

Plymouth, 1960, 6-cyl. station wagon, \$795. Redondo Bch., 374-1124. A

Land, 23 acres near Lake Isabella, good water area, \$1000 acre w/5000 dn., \$20,000. Orange, 714-532-1361. A

House, 3-bdrm., 1 1/2 bath, 5 1/4% G.I. loan, separate outside den, in tree sect. of Manhattan Bch., \$29,000. Manhattan Bch., 372-8536. A

Volkswagen, 1960 sedan, 30 mpg, gas gauge, 4 seat belts, \$750. Santa Monica, 395-0816. A

Coin Collection, U.S. & foreign, proof, mint, gold, \$190. Box 1901. A

Air Conditioner Unit, Poleair, compressor mounts for 6-cyl. motor, \$40. Manhattan Bch., 372-6393. A

Austin Healey, 1966 3000 MK III, all access. & 8-track stereo, \$3200. Hermosa Bch., 372-5933. A

Travel Trailer, 18' Roll-A-Long, twin beds, 6 cu. ft. refrigerator, new 6-ply tires, elec. brakes, 20-gal. glasslined water tank, furnace & new awning, \$650. Santa Monica, EX 4-8641. A

Lot, in Woodland Hills, large pad w/80' frontage, streets & sewers in about 1 year, \$1500 dn., \$11,950. Playa del Rey, 823-1962. A

Dining Table, oval, French Provincial, 40"x54", 2 9" leaves, \$65. Hermosa Bch., FR 4-8036. A

Encyclopaedia, Britannica, world language dictionary in 2 vol., cost \$35; \$15. P.V. Pen., FR 8-1863. A

Wood Shaper, heavy duty, 1/2 h.p. motor, \$50. Huntington Bch., 714-897-6992. A

Organ, Hammond M-3 spinet w/percussion, unmarred maple finish, \$750. San Pedro 831-5837. A

Surfboard, Velzy, custom-made 9'1", \$40. Newbury Pk., 498-2545. A

Divan, chair & 2 mahogany stepend tables, \$30. Hawthorne, 675-8413. A

Volkswagen, 1965, sedan, steel sun roof, radio, shoulder straps, \$1350. Torrance, 371-9730. A

For Sale

Oven, Gaffers & Sattlers bltin, single dr. & broiler, gas, copper tone finish, \$25. Lawndale, 679-2642. A

Drum Set, \$50. Torrance, 328-4647. A

Supercharger, Judson, for VW, all parts & instructions, \$85. Lomita, 326-0221. A

Travel Trailer, 16' Scotsman, many extras, completely equipped, \$450. Long Bch., 425-1938. A

MG TD, 1951, eng., brakes, clutch, gear box o/hailed, 5000 miles, \$695. Manhattan Bch., FR 9-7775. A

Guitar, Guild Troubadour, 6-string, orig. cost, \$150; \$80. P.V. Pen., 377-9723. A

Camera Lens, Nikkor F, 28mm, f/3.5, wide angle, cost \$179; \$95. Box 1902. A

Refrigerator-Freezer, portable, 110-120 volt house current or 12 volt car battery, 5 cu. ft., cost \$130; \$75. Gardena, 323-8657. A

Outboard Motor, Evinrude, 9.7 h.p., \$40. Torrance, DA 6-8273. A

Bar-B-Que, gas, never used, \$15. Hawthorne, 679-5371. A

Dinette Table, Formica top w/leaf & chairs, \$15. Inglewood, PL 5-8158. A

House, 2-story, 4-bdrm., 2-bath, fireplace, cpts., dps., next to school & golf course, 5 1/4% FHA loan, \$26,900. Torrance, 375-6071. A

Surfboard, Roberts, 9'8", 3 stringers & redwood tail block, \$62. Westchester, 670-0472. A

Boat, 14' outboard motor, Evinrude 25 h.p. & trailer, \$295. Gardena, DA 4-8853. A

House, 1315 sq. ft., 3-bdrm., 2-bath, dble. gar., cpts. & dps., about 5 yrs. old, 20 min. from Norair, existing loan for \$18,500 at 5 1/4% int., \$145 mo. pymt., owner take 2nd for part of bal. w/small dn., \$23,750. Wilmington, 830-0740. A

Oldsmobile, 1955 Super 88 Holiday 4-dr. h/top sedan, Hydramatic, p/s, p/b, AC smog control, new brakes, w/s/w tires, battery, ignition wiring, \$200. Downey, 861-7035. A

Ford, 1957 Fairlane, T-Bird special eng., auto. trans., p/s, \$280. L.A., 670-3832. A

TV Set, 1963 21" console w/remote control, \$100. Inglewood, OR 7-8868. A

Stove, elec., General Electric, \$25. Redondo Bch., FR 5-5760. A

Volkswagen, 1956 sedan, radio, \$350. Inglewood, 675-8173. A

Washer, Easy, wringer-type, \$25. Hollydale, ME 3-2395. A

Corvair Monza, 1964 convt., r/h, w/w tires, low mileage, \$1495. San Pedro, 831-5283. A

Ford, 1957 Ranchero pickup, air cond., r/h, near new motor, \$650. Hawthorne, OS 5-8335. A

Lawn Sweeper, Parker rotary brush w/catcher, \$9.95. Inglewood, 675-0788, 10 a.m. to 2 p.m. A

Table, Drexel Harvest, w/4 chairs, walnut, \$150, other pieces various price. Hermosa Bch., 374-1337. A

Tape Recorder, Tentrion, \$50. Box 1903. A

Stove, gas, \$20. Newport Bch., 714-646-7605. A

Citizen Band, 2-way radio Exec., 5 watts, w/antenna, extras, \$125. Torrance, 325-3724. A

House, Inglewood Knolls, 3-bdrm., 1 1/4 baths, cpts., dps., fireplace, forced air heat, \$24,950. Hawthorne, PL 4-2049. A

Television, 23" 1963 Packard Bell, mahogany console cabinet, \$75. Torrance, DA 6-8590. A

House, 3-bdrm. & lge. den, space for boat, near fwy. & schools, cpts., conv. financing, 10 min. to Norair, \$21,900. Gardena, DA 9-2304. A

Motorcycle, 1964 Honda 305, Super Hawk, low mileage, \$395. Granada Hills, 363-3987. A

Refrigerator, Philco, \$20. Manhattan Bch., FR 9-5024. A

TV, 1960 G.E., portable, w/stand, needs tubes, \$45. Hawthorne, 675-5265. A

Racing Bicycle, 10-sp., Dinamo, lamp, \$18. Inglewood, 674-1885. A

Lot, 2, Topanga Canyon, adjacent w/5000 sq. ft., water & elect. in, low taxes, financing avail., low pymts., \$3500 ea. Pasadena, 823-2523. A

Guitar, elec. & amplifier, 2 mikes, never played, cost \$96.20; \$70. So. Gate, 633-4477. A

Chevrolet, 1953, new eng., trans., rearend & brakes, 1963 Chev. SS bucket seats, \$350. Box 1904. A

Chevrolet, 1954 station wagon, new tires, short block w/20,000 mi., good clutch, \$75. L.A., 755-8233. A

Movie Camera, 8 mm Bolex P-1 zoom lens & meter, \$150. P.V., 377-5059. A

Telescope, Swift refractor-type, 3" objective lens, 4-eyepiece turret head, mounted on tripod, wood carrying case, many extras, \$200. Box 1905. A

Range, Tappan 400 elec., all access., 2 ovens, \$300. Box 1906. A

Trombone-Conn, Connquest, blue case, cost \$200; \$175. L.A., PL 1-4014. A

Home, 2-bdrm., full dining room, fireplace, dble. gar., \$20,950. Inglewood, OR 1-3860, FR 5-5097. A

Motorcycle, 250 cc Yamaha YDS-2, 1964, \$385. Rolling Hills Ests., 375-7038. A

Comeet, 1961 deluxe, 1-owner, low mileage, good tires, stick shift, \$450. Gardena, 327-2756. A

Wanted to Buy

Pool Table, 4'x8' slate top, any condition at right price. Redondo Bch., FR 2-8254. B

Power Edger, Santa Monica, 392-2136. B

Snow Skis, men's. Lawndale, 676-2720. B

Trailer, 14' to 18', preferably self-contained, must be priced reasonably. Santa Monica, 393-1106. B

Bar Bell Set, approx. 100 lbs., Torrance, 371-1830. B

Hardtop, for Austin Healey, 1959 roadster. Hawthorne, 675-9552. B

Amplifier for bass & lead guitars, must be heavy enough to handle volume, Fender or Vox preferred. Hawthorne, OS 6-8331. B

For Trade

Contact Printer, Airequipt, takes up to 4x5 neg., & 16x13 elec. print dryer, trade for U.S. &/or foreign stamps. Box 1907. C

FREE (To Be Given Away)

Dog, miniature Schnauzer, male, black, registered, 4 yrs. old. Hawthorne, 675-1683. D

Rentals Offered

Bachelor Apt, furn. utilities pd., 2 blks. to Norair, \$85 mo. Hawthorne, OS 6-7417. E

House, 3-bdrm., 1 1/4 baths, disp., fenced yd., near shopping, lawn & water pd., 8 min. to Norair, \$130 mo. L.A., PL 4-1964. E

Apt, 1 & 2 bdrm., 1-bdrm. furn., quiet adult bldg., near all, \$110 & up. Woodland Hills, 347-5000. E

Sleeping Room, \$12 wk. Inglewood, 671-3798. E

Apt., 1-bdrm, cpts., drps., bitlins, gar., close to Northrop, \$95 mo. Harbor City, 325-5705. E

Executive Home, on 1/2 acre, harbor view, 3 bdrm., 1 1/2 baths, den, enclosed patio, 3 fireplaces, lge pool, avail. Oct. 15, \$400 mo. w/option to buy. Torrance. 324-7119. E

House, 2-bdrm., unfurn., cpts., fenced, \$110 mo. Torrance, 378-0500. E

House, 3-bdrm., fenced yd., near Northrop Norair, children OK, \$175 mo. Gardena, DA 4-9321. E

House, 2-bdrm., 2 bath, rumpus rm., 2 fireplaces, cpts., dps., elec. range, fenced yd., 2-car gar., water pd., \$250 mo. Inglewood, 672-3764. E

House, 3-bdrm., 1-bath, disp., cpts., fenced, water, trash & yard care paid, newly painted, \$165. Torrance, 3/C-2794. E

Cabin, Lake Arrowhead, walk to lake & village, fireplace, all modern facilities, \$25 w/end; \$55 wk. No. Hollywood, 761-9645. E

Cabin, Big Bear Lake, mod., sleeps 7 to 9, \$18 w/end; \$50 wk. Bellflower, TO 7-0662. E

Apt, deluxe 2-bdrm. unfurn., lge. pool & patio, cpts., dps., bitins, closed gar., near El Camino, adults, \$120. Torrance, DA 9-5986. E

Apt, 1-bdrm., unfurn., pvt. patio, closed gar. sound conditioning, hobby shop, hot water & trash pd., \$95 mo. Torrance, FR 5-0867, 320-7547. E

Apt, 2-bdrm., cpts., dps., encl. porch, gar. & laundry room, near shopping, \$105. unfurn.; \$130 furn. Torrance, DA 3-7544. E

House, 2-bdrm., near Northrop, water & trash paid, disposal, \$110 mo. Lawndale, 675-9695. E

House, 3-bdrm., in Mar Vista, fenced front & back yards, disp., cpts., gar., lease required, no pets, \$170. Santa Monica, EX 4-3345. E

Apt, 1-bdrm., furn., all bitins, pvt. deck, lge. pool, ample sub. parking, near Northrop, \$135 mo. Lawndale, 679-2117, 670-6684. E

Studio Apt, 2-bdrm., 2 1/2 bath, pvt. deck, sub. gar., cpts., dps., dishwasher, elec. bitins, near San Diego Fwy., adults, lease, \$180. Inglewood, 673-0615. E

Studio Apt, 2-bdrm., unfurn., dps., cpts., beam ceilings, disp., pvt. patio, refrig. & stove optional at \$10, adults, \$125 mo. L.A., 756-7990. E

Apt, 2-bdrm., modern, in Torrance, \$180 mo. Newport Bch., 714-646-7605. E

House, 2-bdrm., cpts., stove & refrig., \$95 mo. Compton, 639-8419. E

Rentals Wanted

Family w/2 girls, ages 13 & 6 yrs., want to rent 2 or 3 bdrm. house w/gar. & yard Oct. 1 in Del Amo vicinity. Lawndale, OS 9-4162. E

Child Care Offered

Child Care, close to Northrop, experienced day care by former pediatric nurse, incl. hot meals, Hawthorne, 675-4574. G

Personals

We wish to thank our many friends at Northrop for their kindness & thoughtfulness in the loss of our mother & daughter, Viola Lehto. ARNOLD LEHTO & MRS. NAIMA ELO. L

Dogsitter wanted, 2 or 3 days a week, your home. Inglewood, 671-4339. L

We wish to express our appreciation to our many friends at Norair & Nortronics for their kindness & help in our recent bereavement. MARIAN & JACK COOPER. L

Flying Club, new Cessna 150 Commuters \$7 hr. wet, ILS equipped, full gyro panel, students welcome, qualified flight instructors avail., based at Torrance. Hawthorne, OS 6-6138, DA 5-5288. L

For Sale or Trade

Trail Bike, 1965 Hodaka 90 cc, custom rack & paint, 3 sprockets, \$195 or trade for 160 to 250 cc bike. Redondo Bch., 376-9875. M

GHOSTS

(Continued from page 2)

now racing in Ghost competition.

Mr. Larsen reasons some 40 Ghosts have now been built and that most are still operating, with distinction, in Southern California.

And Ghosts are still being built.

Norair's Sea Scouts offer a well-rounded program for boys between the ages of 13 and 18 years. Sailing is a major endeavor, as is canoeing and rowing, field trips and general instruction in seamanship, life saving and swimming.

Meetings are held (from 7 to 8:30 p.m.) each Monday at the Hawthorne Naval Reserve Center on 126th Street, one block west of Hawthorne Blvd.

Flying Object Foiled By Safety Glasses

A "flying object" struck again early this month at Northrop Norair, but thanks to safety glasses no injury was sustained.

James De La Hoz, an aircraft structural mechanic, was assisting a fellow worker in drilling rivet holes in an aft fuselage component for the Boeing 707. The drill bit was deflected by a steel setup bolt and shattered. The drill tip struck Mr. De La Hoz on the right lens of his safety glass, which promptly shattered, but protected his eye.

Mr. De La Hoz is the 84th Northrop Norair employee to become eligible for membership in the "Wise Owl Club of America," a select group of individuals who have escaped possible eye injury through the wearing of safety glasses.

Square Jets Open New Adult Class

The NRC Square Jets open a new series of adult beginning square dance lessons tomorrow night at Hill Rancho, 15701 Crenshaw Blvd.

Northrop couples may join by attending any of the 8 p.m. sessions each Thursday through October 20. The cost is \$1.25 per lesson.

For Sale or Trade

Falcon, 1961 4-dr. station wagon, deluxe, r/h, w/w, auto. trans., new eng., \$750 or trade for 1/2-ton pickup truck, GMC or Chevrolet. Torrance, DA 5-7705. M

House, 4-bdrm., family rm., 2 baths, fenced yd., 1 mile to Research Park, 5 1/4% existing loan, \$39,900 or trade for house in Inglewood-Westchester area. P.V., 377-5172. M

Sander, Sunstrand mod. 1000, air-powered, dual pad & spray gun, Binks mod. 7, spare parts, air hose, \$70 or trade for .22 cal. pistol, rifle or shotgun, 16 or 20 ga. Box 1908. M

Going my way?

Rides Wanted

7 a.m. — 3:42 p.m.

City of Orange, Orange. Wish to get ride with someone who passes through or goes to the city of Orange. L. R. Slininger, Norair, ext. 2105.

Lampson & Valley View, Garden Grove. Mike Houlihan, NSL, ext. 1813, 897-6317.

Pier Ave. & Ford Ave., North Redondo. Susan Harrison, Norair, ext. 2695.

Branford Lane, La Habra area, La Habra. Faith Reed, Nor. Anaheim, ext. 495, OU 1-7552.

8 a.m. — 4:42 p.m.

Arbor Vitae or Manchester, Inglewood. Wanda M. Clark, Norair, ext. 2013, 2014, 673-2496.

Inglewood Ave. & El Segundo Blvd., Hawthorne. Dorothy L. Muzik, Norair, ext. 2123, OS 6-0790.

Pacific Coast Hwy. & First Pl., Hermosa Beach. Ymelda Fettig, Nor. Hawthorne, ext. 403, FR 9-2373.

Blossom Lane & 190th St., Redondo Beach. Henry Arnold, Nortronics Haw., ext. 450.

Airport Blvd. & La Tijera, Los Angeles. Mary Sutton, Norair, ext. 2522, 645-7114.

Auto Device To Be Sold By Achievers

The Northrop Ventura-sponsored Junior Achievement program is starting the 1966-67 fiscal year the same way it finished the last year—making useful, practical devices for motorists.

CONACO, last year's company, prepared and marketed emergency road flare kits. This year's company, as yet un-named, will sell spring-loaded tie-down straps, for use by motorists who have an oversized load in their car trunk.

Doug Finch, beginning his sixth year as an advisor in the program, said the tie-down straps will be especially useful to "do-it-yourself" types.

"People who carry, for example, lumber or other building materials which will not fit entirely in their trunk will be able to close the trunk as far as possible with the tie-downs," Mr. Finch said.

The tie-down strap consists of a spring with a hook at either end. One hook is placed inside the trunk; the other, on the rear bumper.

Mr. Finch said he and the other Ventura advisors will be meeting with students interested in participating, probably on October 11. The students are from Thousand Oaks High School.

"At that time," Mr. Finch said, "the students will elect officers, select a name for the company and make plans for marketing the tie-downs."

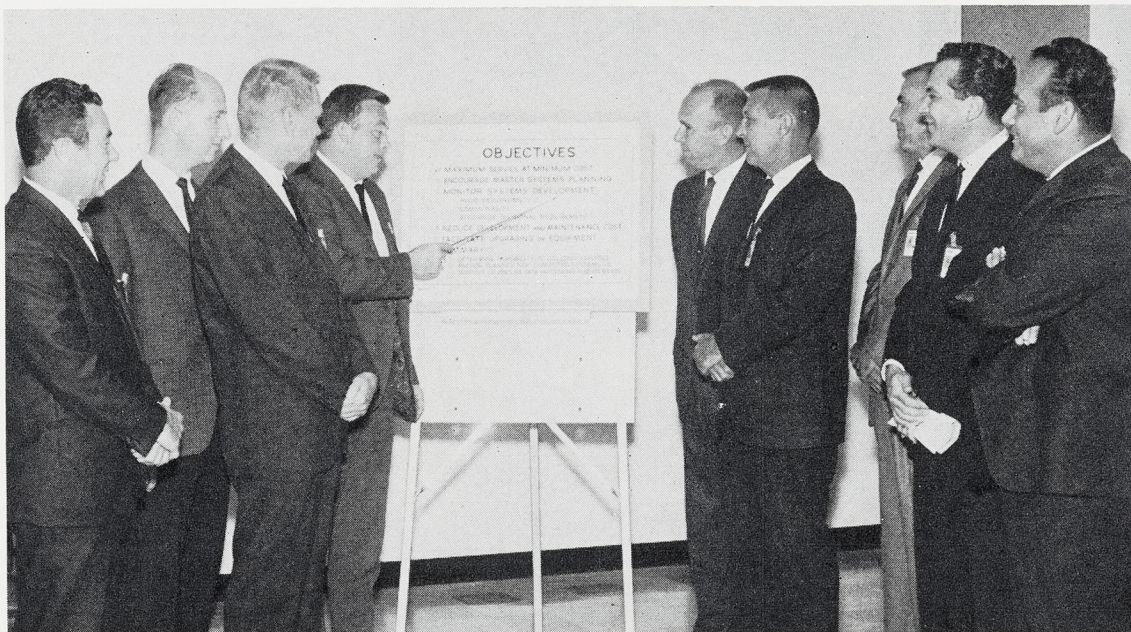
Working with Mr. Finch are Roger Marshall, Chuck Taylor, Andy Andrews and Sherry Cable.

Junior Achievement, a national program, is open to high school sophomores, juniors and seniors. It offers them experience in company management, marketing, sales and over-all business management.

In 1964, the Ventura-sponsored company was judged among the best in the state, marketing Christmas candles which the students made, and road flare kits.

The limitation on Series E Savings Bonds purchased and held in any one calendar year has been increased from \$10,000 (maturity value) to \$20,000. The H Bond limitation went up from \$20,000 (face value) to \$30,000.

A COST-SAVING PLAN



Members of a Northrop Ventura study group on Product Documentation watch as Norvel Humphreys points out the objectives of the new plan. Members of the study team are (from left) Ted Randolph, Jim Kleinman, Ron Hegge-land, Mr. Humphreys, Bob Hutton, Paul Culver, Wayne

Beeman, Dan Cashier and Chuck Merlian. Product Documentation is the combination of specifications, requirements and all other elements which relate to a given contract, into a computerized data bank. The first phase of the plan has been approved.

REFERRAL AWARD RAISED TO \$100 FOR NEW HIRES

Northrop Ventura employees who refer a plastics fabricator for hiring now will receive \$100 incentive awards, twice the amount formerly paid.

The announcement was made by D. D. Archer, chief of the Personnel group, who also said the \$100 incentive awards for plaster pattern makers or plastic tool and fixture builders are still in effect.

A build-up in plastic production activities has made the need for qualified fabricators especially great, Mr. Archer said.

Any applicant referred under the plan must be hired on a full-time basis and must remain on the payroll for at least 90 days.

All employees are eligible to receive incentive awards, except corporate and division officers, supervisors of the applicant being employed, department managers, section directors, group chiefs and personnel regularly employed in hiring activities.

The referred applicant must present a referral award card at the time of initial contact with Industrial Relations.

The cards (Form 50-106) are available in Room A118 (Administration building).

Only Two Weeks Remain For Joining Savings Plan

Only two weeks remain to sign up for the Salaried or the Hourly-Rated Employees' Savings Plan before the beginning of the next fiscal quarter (November through January), Northrop Ventura Industrial Relations officials have announced.

The deadline for employees to authorize deductions, or to change the amount of their current deduction for either plan is Friday, October 14, Rex Fairless, director of Industrial Relations, said. Employees who do not sign up before the deadline cannot participate until the following fiscal quarter, which is next February.

Under the Salaried Employees' Savings Plan, employees may contribute any whole-dollar amount that is not less than 2 percent or more than 5 percent of their weekly base salary. When

an employee has been a member of the Savings Plan for three continuous years, he may increase his weekly contribution to a maximum of 8 percent of his base pay.

The Hourly-Rated Employees' Savings Plan allows for a weekly contribution of \$2, \$4, or \$6.

Under both plans, the employee may choose to have his money invested either 100 percent in the Bond Fund (obligations issued or guaranteed by the Federal, State, or local Government), or 50 percent in the Bond Fund and 50 percent in the Stock Fund (common or preferred stocks of corporations other than Northrop). In both cases, for every dollar contributed by an employee, the company will contribute 50 cents of Northrop common stock.

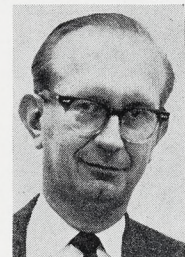
A formal statement is issued to all members of both the Hourly and the Salaried Plan as soon as possible after the end of each fiscal year. It shows the exact extent and status of participation at the beginning and at the end of the fiscal year (starting the first day of August).

Application cards and booklets explaining both plans in detail are available in the Industrial Relations office, Mr. Fairless said.

Vern Lippert Tops Monthly Awards List

A man who joined Northrop Ventura on September 10, 1946, as an engineer checker this month became the Division's latest 20-year pin recipient.

Vern Lippert, a senior proposal administrator in the Estimating branch, has had varied assignments in his tenure at Northrop Ventura. He advanced from engineer checker to recovery systems design, and then to aerodynamics. He spent 3 months for North-



Mr. Lippert

throp at Wright-Patterson Air Force Base in Dayton, Ohio and 11 months at Holloman Air Force Base in this capacity.

He was an assistant project engineer on the RP-52 drone and on the Crossbow missile program. He became a senior proposal administrator in April 1965.

He was one of 25 employees to become eligible for service pins in September. Seven received 15-year pins; 11, 10-year, and six, 5-year pins.

Fifteen-year men are:

Raymond Borzage, Loren Brown, Lewis Fisher, Walter Jackson, Marvin Miller, H. E. Riggins and Marvin Shered.

Ten-year pin recipients are:

Clyde Corder, Douglas Finch, William Gundelfinger, Maybert Kennedy, Gerald Koopman, Milton Lanning, Fred Longo, Bernard Montag, Donald Peck, Eugene Smith and Ervin Stump.

EARNINGS

(Continued from page 1)

liners, but none of this will result in significant sales until 1969-70. We expect that our role in the 747 program will, over the long run, exceed \$500,000,000," Mr. Jones said.

Earnings per share for the fourth quarter were 85 cents, compared to 62 cents a year ago. Consolidated net earnings for the fourth quarter were \$3,570,000, compared to \$2,547,000 for the same period last year. Fourth quarter sales were \$112,990,000 compared to \$83,430,000 in 1965.

THOUSAND OAKS COMMUNITY THEATER IS POPULAR PASTIME FOR EMPLOYEES AND FAMILIES



Conejo Players theater group of Thousand Oaks held dress rehearsal last week in preparation for opening of "I Remember Mama," which is being presented each Thursday, Friday and Saturday through October 15. At left, Tom Waters, portraying Uncle Chris, has man-to-man talk with Paul Petterson (Mr. Thorkelson). Mr. Waters is assistant golf professional at Thousand Oaks Country

Club. In center photo, Al Martin of Northrop Ventura Quality Control (Doctor Johnson) gives assurances to Mama (Dorothy Dumond). Mrs. Dumond is the wife of Lou Dumond, another Northrop Ventura employee. In right photo, Marianne Murry (left), daughter of Northrop Ventura's Warren Murry, shares scene with Betsy Toll. Denise Rowlett, daughter of Northrop's Bob Rowlett, is also starred.

NORTHROP NEWS

NORTHROP VENTURA

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October 12, 1966

Jones Cites Opportunity For Growth

"Northrop's outlook today is clearly one of growth," Northrop President Thomas V. Jones told Norair Management Club members last week. "Not that it is inevitable or that it will come automatically, but the opportunity is there if we make the most of it."

Mr. Jones was principal speaker Friday evening, at the October dinner meeting of the Club at the Airport Marina Hotel.

"We have a backlog of \$574 million now. In it are programs that still have a lot of growth in them. These, together with foreseeable opportunities for new contracts, make up a very meaningful possibility of significant growth within the framework of our present business," Northrop's chief executive said.

"On top of that we have for some time been working on a program to acquire other businesses that will complement our present corporate makeup and broaden the range of our activities to include a great deal more that is of an industrial and commercial character.

"Rapid growth which is not accompanied by sound corporate control can get out of hand," Mr. Jones warned. "At that point growth ceases to be an asset and becomes a liability. A billion dollars in backlog can mean the potential of larger earnings or it can mean the danger of losses.

"Effective management procedures are essential to assure that a big backlog will lead to profits," Mr. Jones said. "Cost reduction is important," he said, "but it must contribute to company profitability.

"Earnings are the key to growth and greater opportunity," the chief executive said. "Right

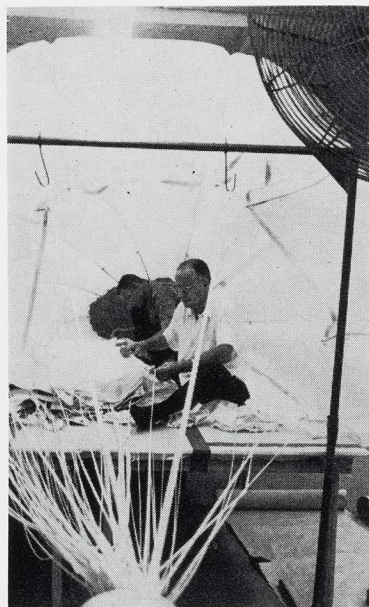
(See TALK, page 6)

VIEW FROM A PARACHUTE



Gary Drumheller, from Northrop Ventura's Paralab, carefully examines the hem of a steerable parachute, constructed by the division. The parachute was inflated by an electric fan

(below) to facilitate the inspection by Mr. Drumheller and C. A. (Hap) Hagler. Parachute was inspected prior to drop tests at El Centro.



Safety Groups Named; Accident Rate Reduced

Four safety committees, which have helped lower on-the-job accidents and time lost due to accidents at Northrop Ventura since they were first formed, have been appointed for 1967.

The appointments, effective October 31, were announced by H. E. Riggins jr., vice president and assistant general manager.

Last year at this time, 11 on-the-job accidents had occurred, costing 154 man-days of lost time. This year, the accident rate has been more than cut in half. Five accidents have led to 51

days off the job.

The groups are the General Safety Committee, Supervisor's Safety Committee, Workman's Safety Committee and Hazardous Materials and Devices Committee.

The Workman's Safety Committee inspects all working areas each month for possible dangerous conditions. The Hazardous Materials and Devices Committee conducts monthly inspections of all hazardous areas.

Safety personnel are:

General Safety Committee—William Kearney (chairman), director, Production and Production Engineering; A. P. Binsacca, supervisor, Materials Engineering; Phil Chase, director, Facilities and Properties; John Evans, group chief, Experimental Fabrication, Rex Fairless, director, Industrial Relations; George Johnson, group chief, Quality Assurance; Charles Simmers, security officer; and Stephen Wrubel, metal fabrication.

Supervisor's Safety Committee—Carl Emerich (chairman), superintendent, Experimental Shops; Clyde Corder, group chief, Plant Engineering; Elinor Eckels, nurse; Dale (Buck) Gilmore, foreman, Metal Fabrication and Assembly; Al Martin, branch supervisor, Quality Engineering; Harry McLaughlin, foreman, Plastic Products; and John Steman, supervisor, Plant Protection.

Workman's Safety Committee—J. R. (Andy) Andrews (chairman), branch supervisor, Manufacturing; Augustine Garcia, Fab-

(See SAFETY, page 6)

Jet Powered Target Drone Introduced

The NV-105, Northrop Ventura's new target drone aircraft designed to sharpen the marksmanship of military gunners and missile crews, was publicly displayed for the first time this week.

The drone was shown Monday through Wednesday in Washington, D.C., at the annual convention of the Association of the U.S. Army.

The new jet-powered drone is a highly maneuverable target, capable of flying at speeds up to 400 knots per hour, and altitudes up to 40,000 feet. It is 11½ feet long, has a 5½-foot wing span, and is powered by a Williams Research Corporation turbojet engine.

The engine which weighs only 32 pounds, delivers up to 121 pounds of variable thrust during the more than one-hour flight endurance of the drone.

The NV-105 may be launched from standard existing Army or Navy ground equipment, and is recoverable by parachute to serve repeated missions. It was designed under military cost effectiveness guidelines.

The target drone is radio-controlled either in line of sight or by radar tracking. It carries on-board radar augmentation lenses, which provide the image of a full-sized attacking aircraft to gunnery and missile crews firing at the target.

The NV-105 was designed to fill an Army and Navy need for a medium performance target for surface to air gunnery and missile practice. It can provide realistic target training for crews operating 40-millimeter, 20-millimeter and 50-caliber guns, as well as the Hawk, Redeye, Chaparral and Nike Hercules missiles.

Ventura, NARD Join Conejo Association

Northrop Ventura and Northrop Nortronics Applied Research department, both with headquarters in Newbury Park, are two of the nine charter members of the newly formed Conejo Valley Industrial Association.

The nine firms, all in the Rancho Conejo Industrial Park area, formed the association, according to a press release, "to promote the mutual welfare of member firms and their employees.

"In particular, the association hopes to stabilize the labor force by a mutual exchange of information concerning personnel needs and requirements, in order that displacement of people into and out of the area may be kept to a minimum."

Dr. Donald A. Hicks, man-

(See CONEJO, page 6)

UNUSUAL HOBBYIST

Stuffed Animals to Waffle Irons

Making stuffed animals, aluminum waffle irons and wooden clocks might seem to be unlikely hobbies for an electronic engineer, but that doesn't deter Northrop Ventura's Donald W. Peck.

Mr. Peck, a senior electronic engineer in Manufacturing Engineering displayed one of each of his products during the past week at the Ventura County Fair. The clock was a first prize winner.

Of the three hobbies, the stuffed animals came first. Daughters Susan, Deborah and Jennifer, now 17, and 15 and 13, were about 10 years younger then, and had become rather fond of a stuffed donkey made by Mr. Peck's mother.

The toy had deteriorated with age, and the children hated to lose such a good friend, stuffed or not. So Mr. Peck took the donkey apart, made a pattern

from it and produced a new one.

After turning out 25 or 30 more donkeys for friends and relatives, Mr. Peck moved on to snakes, elephants, starfish and—most recently—octopuses.

The newest octopuses, one of which was included in the county fair exhibit, are about 24 inches long and are made of satin. All of Mr. Peck's animals are filled with Dacron ("it's more expensive than other materials, but it's washable, and foam rubber rats and bunnies up.")

Next came the wooden clocks. Mr. Peck had made a grandfather clock but had purchased the gears for it. When he decided to make other clocks, he decided to machine his own gears.

"I figured I had more machinery in my garage than most clockmakers did 100 years ago, so I thought I'd give it a try,"

he said.

"I set up for making gears, and turned out some wooden ones, just for practice. They came out well, so I continued to use wooden gears."

Mr. Peck has made five clocks, and his oldest daughter made one last year, entered it in a science fair and took second prize.

The clocks are made from madrona, a hard wood, have wooden hands and all wooden moving parts except for steel axles and brass escapement.

"They're more for conversation than for telling time," Mr. Peck said. "They'll vary a couple of minutes a day, and dampness might even stop them completely, since the tolerance of the gears is very critical, and damp weather swells the gears.

"As soon as the dampness

(See HOBBIES, page 6)

HENDERSENS' GIVE IT LIFE

Private Ghost Town Full of 'Dead Soldiers'

Not many people start collecting old bottles and wind up with their own ghost town.

Hal Hendersen and his family did.

Now the Hendersens are the sole owners, residents, operators and promoters of "Iona City" in Canoga Park. It occupies part of a one-acre plot behind the Hendersen home.

(Mrs. Hendersen's name is Iona. The name combination is a paraphrase—I own a city—that tickles the Hendersens' fancy.)

Money can't buy admission to "Iona City." Interest will.

Interest, that is, in the study and preservation of 19th Century gold and silver mining camps that flourished, that died, in the west. Most are now ghost towns.

But about those bottles, the starting point.

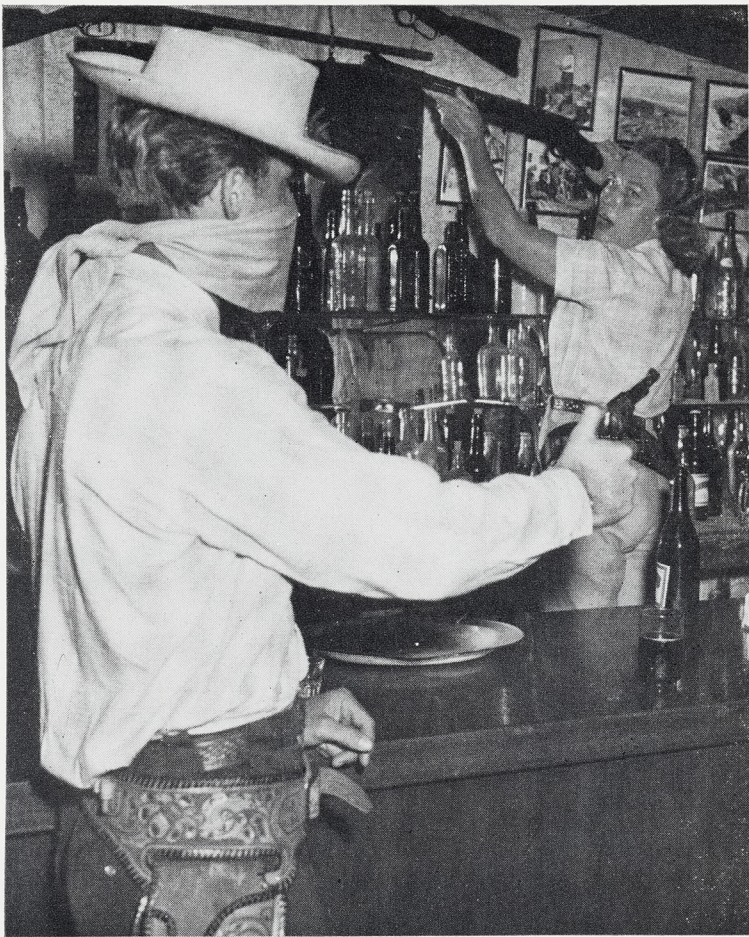
Mr. Hendersen, a process analyst in Quality Control Engineering (Critical Parts Control group) at Northrop Norair, his wife and daughter, Carole, and granddaughter, Lisa, are long time rockhounds and desert lovers.

They began noticing old bottles, aged and colored by sun, years ago. They brought a few home, then a few more. Soon all available storage space was filled, with bottles.

So the family ripped out the back of a two-car garage and extended it as a showcase for their bottles. It was dubbed the "Hard Cash Saloon." Other relics were added—a bar, a potbellied stove, an old mining safe, pictures, guns—until the place looked just like a western saloon. Sawdust was added to the floor.

"This project broadened our interest and led us to seek other artifacts," Mr. Hendersen said. "Ghost towns became the objective for our weekend trips, salvaging our goal."

Employed then (about four years ago) at North American Aviation in Canoga Park, Mr.



HOWDY PAHDNER—Iona Hendersen, co-proprietor of Canoga Park ghost town saloon, prepares to defend invaluable bottle collection, which Hendersen family has been amassing for years.

Hendersen fell to discussing his trips with fellow employees and uncovered shared interests. This led to the formation of a Ghost Town Club. It now has a membership of 35 units (each unit is a family).

Meeting twice each month and conducting field trips once a month, the group works diligently to promote the preservation and restoration of this era of history. They took a very active role leading to the establishment of the town of Bodie as an historic site, protected by law.

"Salvaging for restoration is quite different from outright vandalism," Mr. Hendersen said. "We are working against vandals, and

time, to recreate this era for future generations to know and understand."

Although towns with names like Pioneer, Goldpoint, Silverpeak, Blair, Thorpe, Masonic, Ivanpah, Panamint City and Cerro-Gordo appear on few maps, they are well known to ghost town lovers.

From these towns and others like them have come items to add to "Iona City"—blacksmith tools, ore buckets, mine carts, wagon wheels and springs, old stoves and other relics.

After the "Hard Cash" was completed, the Hendersens added an office-display room for bottles and harness making gear. A stove

and iron works followed. Then a brewery (bottles again) was recreated. A tumbled-down miner's hut, made of block, lends an air of authenticity to the layout. A hay barn is both decorative and functional—it holds feed for the burro, goat and ducks who call "Iona City" home.

False-front buildings are replicas of a hotel, jail and mining equipment store, each with its share of artifacts.

Behind all this is "La Mina Perdido del Lagarto Rojo" (The Lost Red Lizard Mine). It is laid out like an old gold mine with tracks, carts, excavating tools, the works. (It is also used to produce sand and gravel for building projects.)

Much of the lumber and other building material used was obtained from old buildings being demolished. The Hendersens did all the construction work themselves.

Careful records are kept of each relic, especially those given by others. They contain information as to the origin, location and possible use of the item.

Other files contain maps, literature and personal data compiled on the many known, and some unknown, ghost town sites.

Mr. Hendersen and his friends laugh at their perchance for excavating old city dumps, the locale of many of their most cherished finds.

"A dump reveals a great deal about the character of the town it served," Mr. Hendersen explained.

Shallow, poorly covered dump areas with many liquor and meat sauce bottles means the camp was probably frequented by men. Well dug and covered dumps containing medicine bottles and household items, in contrast, means families lived in the camp.

While "Iona City" has given the Hendersens a new prospect

(See BOTTLES, page 4)

Presbyterians Tab Morris Plotkin as 1966 Man of Year

Morris Plotkin, Corporate director of Industrial Planning, has been named 1966 United Presbyterian Churchman of the Year for Southern California.

Mr. Plotkin, a member of the Covenant Presbyterian Church in Los Angeles, received the honor on September 24 at the annual Presbyterian Men's meeting. More than 1000 men attended.



Mr. Plotkin

"The whole thing was a surprise to me," Mr. Plotkin said. "I was sitting there, listening to the speaker, when he started talking about someone. Then I realized I was the one he was talking about."

In a citation read by Robert Hermanson, associate executive secretary of the Synod of California, Southern area, Mr. Plotkin was described as "one of those rare churchmen who grasp and incarnate the real meaning of laity . . . Ministry for him is a profession of faith, and not a province for professionals. Shared by each, it signifies the proper implementing, by all, of the church's mission in the world."

He is ruling elder of Covenant Presbyterian Church, and has been a member of the session for three terms.

He has also served the denomination at regional and national levels.

Millikan Appointed To Policy Committee

Brigadier General Willard W. Millikan, senior eastern representative of Northrop Norair, has been appointed to the Air Reserve Forces Policy Committee.

General Millikan is commander of the District of Columbia Air National Guard's 113th Tactical Fighter Wing, based in Washington.

He has been in the Air National Guard for 20 years, and has more than 3000 jet fighter flying hours. He, his wife and one child live in Alexandria, Virginia.

Premiere Tickets Still on Sale by NRC

Choice reserved seats are still available for the October 25 premiere showing of the motion picture "Hawaii" that has been reserved exclusively for Northrop employees and their guests.

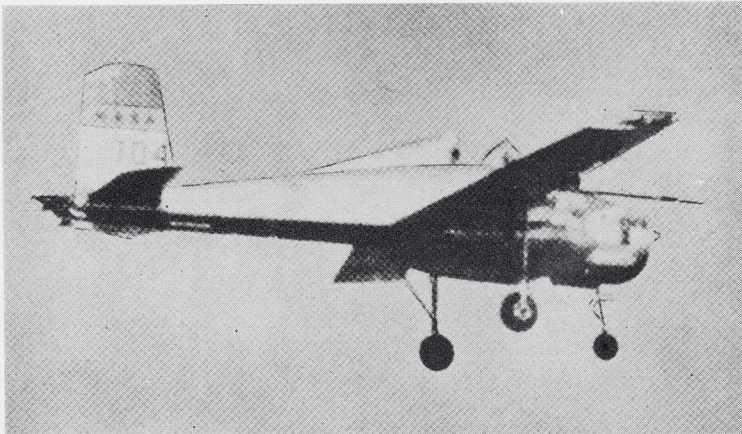
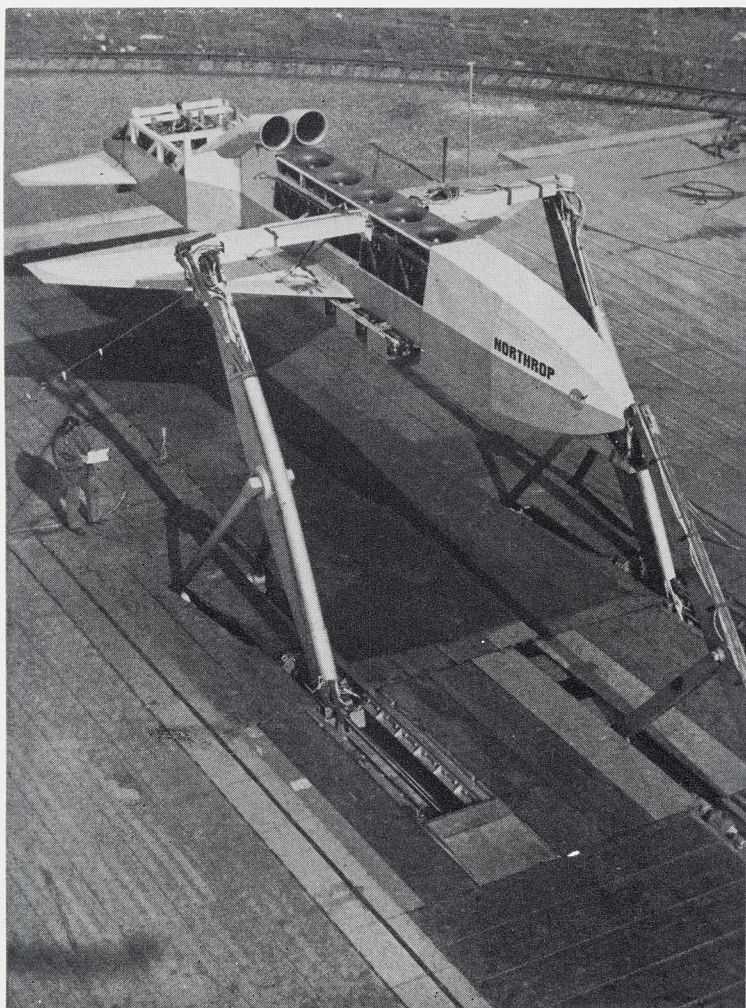
This performance, one of a series of pre-release theatre parties, precedes normal public showings of the epic based on James A. Michener's greatest novel. It stars Julie Andrews, Max Von Sydow and Richard Harris.

By "buying the house," NRC Councils are able to offer reserved seats at a reduction of 50 cents each to Northrop folk. Which means prices (to Northrop participants) are \$3, \$2.50 and \$2.25.

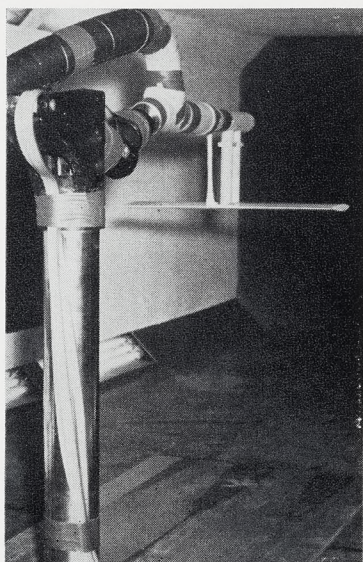
Tickets may be obtained at all Northrop ticket outlets.

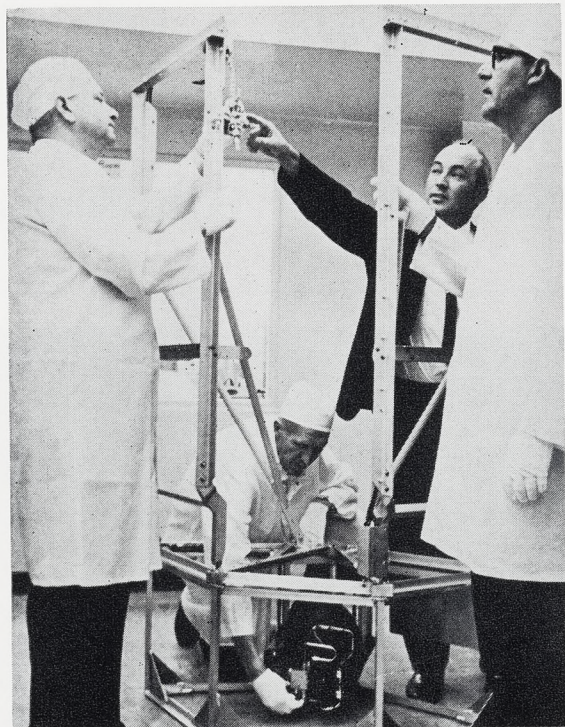
The performance is at 8:30 p.m. at the Egyptian Theatre, Hollywood.

TECHNOLOGY FOR JET V/STOL DESIGN

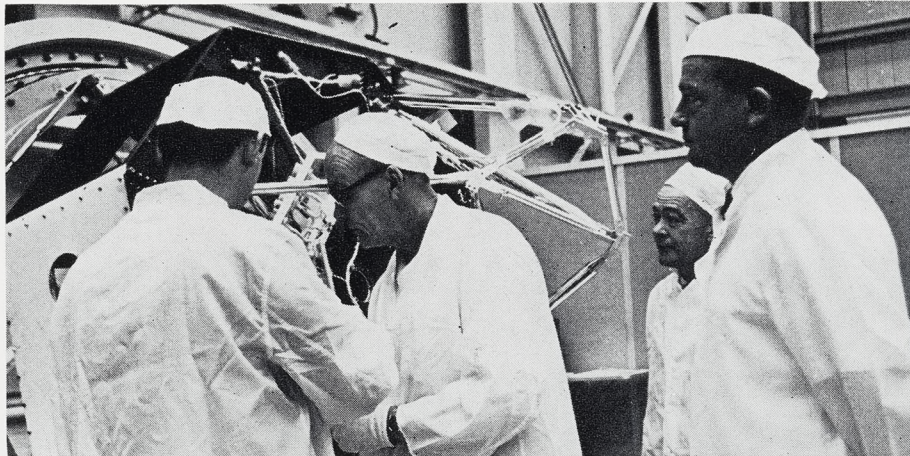


Representative of Northrop's eight-year effort in building technological base for jet V/STOL fighters are: Left—Test vehicle used by Northrop at NASA Ames Research Center to study the influence of hot gas ingestion and jet effects for various Norair VTOL configurations. Above—X-14A, a Navy test vehicle, hovers during flight test. Northrop developed all-mechanical primary flight control system which was demonstrated during this test series. Right—Wind tunnel test of wing and jets to measure jet effect on lift was part of experimental and theoretical work undertaken to predict aerodynamic forces on jet lift aircraft during transition from thrust-borne to wing-borne flight. Earlier this month, NASA's Langley Research Center awarded Northrop a contract for complete design of a jet V/STOL aircraft (story on page 1).

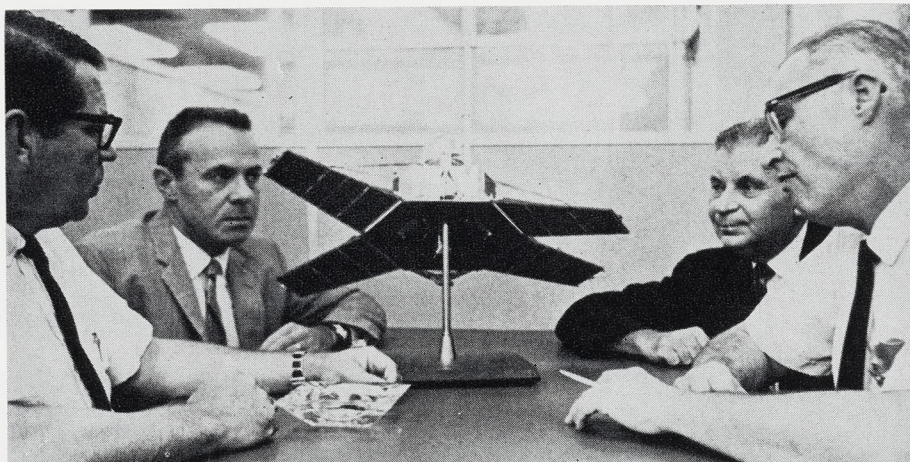
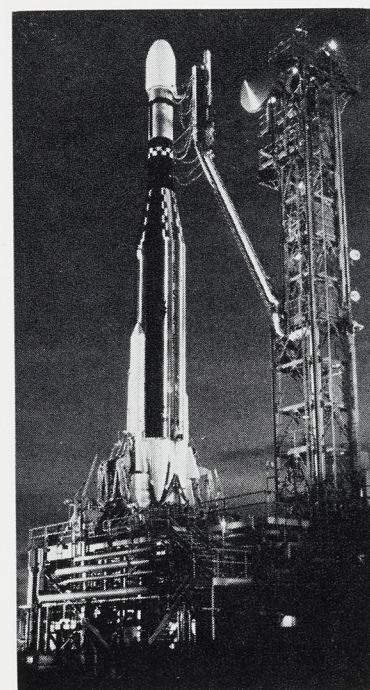




Clay Enoch (kneeling) of Northrop is engrossed in subassembly for Mariner '67 along with (from left) C. E. McKewn, E. F. Koch and George Courville, all of JPL. Below, Dorothy Herzstein, computer programmer, and Bob Mulsby, engineering specialist, analyze data on Mariner '69 telecommunication system effectiveness.



Northrop employees assigned to Jet Propulsion Laboratory are engaged in numerous activities, including: Left—Chuck Fuller (standing), cognizant engineer for development of a sensor which will activate Mariner Venus systems as it nears planet, and Larry Conley. Above—Tom Laney and JPL Test Director Wade Earle watch installation of component on Mariner Venus. Below—Future Missions planners (from left) Ken Fishback of JPL, Bob Rubinstein, Vic Farel and John Meyer of Northrop. Right—Mariner IV poised on launching pad at Kennedy Space Center.



SPACE EXPLORATION

Sharing in a Great Human Endeavor

Sharing in what is probably the most outstanding human endeavor in the history of mankind is one of the greatest feelings a man can experience, says Bob Rubinstein, an advanced space systems engineer at Northrop Space Laboratories.

That endeavor is the exploration of our solar system, and Mr. Rubinstein is one of 48 Northrop technical specialists currently assigned to Jet Propulsion Laboratory at Pasadena where Northrop's Support Operations is providing technical assistance to NASA lunar and planetary missions.

As its literature says, "JPL is a world of its own—a space world where fantastic fancies have been turned into fact, and top technological minds are delving into the shape of future exploits in space."

The scientific climate and the spirit of discovery is almost overpowering, and all of Northrop's engineers and scientists—whether they have been at JPL two days or two years—speak pretty much in the same vein as Mr. Rubinstein.

Northrop specialists at JPL do not work as a team but rather are absorbed throughout the spectrum of the Laboratory's activities. In their functional roles, they report to JPL supervisors. Within Northrop's Support Operations organizational structure they report to Alan Kidd, program manager on the current support contract.

"We are extremely pleased," Mr. Kidd says, "at the opportunity to apply our technological know-how to these significant space programs, while at the same time enhancing our knowledge and skills by working with one

of the most outstanding space teams in the nation."

While some of the Northrop people are presently rushing to meet a flight schedule for another Surveyor soft landing on the moon, others are looking as far ahead as 1990 to as yet un-named planetary explorations. In between are Mariner '67 (Venus), Mariner '69 (Mars), and Voyager '73 (Mars).

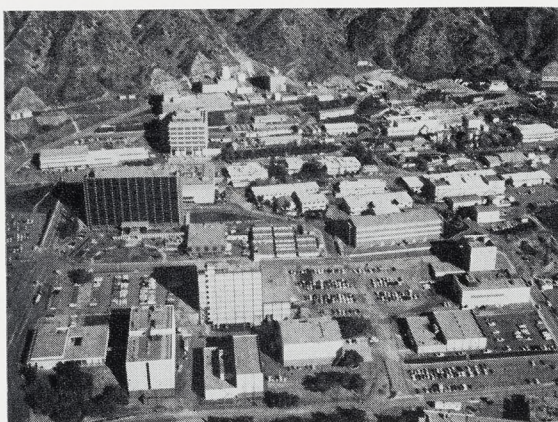
(Technical support of the Mariner Mars mission should not be confused with a separate \$5 million contract awarded Northrop Space Laboratories by JPL for NASA for development and fabrication of spacecraft mechanical systems.)

Vic Farel, with extensive experience in systems engineering and program management for satellite communication systems, is engaged in telecommunication systems engineering and equipment design for the Voyager program.

While the assembly of spacecraft hardware for Mariner '69 is a couple of years away, the JPL Systems Design and Integration section is already putting the pieces together on paper. Supporting preliminary system design for the spacecraft are Gunther Kallman, Don McLain, Bob Moyer, Harvey Sellner and John Spaulding. Principal activities supported are interface definition and control, system integration, weight and inertia control and configuration management.

Telecommunications and computer programming occupy several Northrop specialists. In the Systems Analysis section, Sun Wong analyzes the antenna tracking

(See SPACE, page 4)



Center of JPL complex in the San Gabriel foothills.



Supporting Mariner '69 in Systems Design and Integration section are five Northrop specialists pictured above with their supervisors. From left are Harvey Sellner, John Spaulding, Fred Smith (JPL), Bob Moyer, Don McLain, E. L. Royal (JPL), and Gunther Kallman.

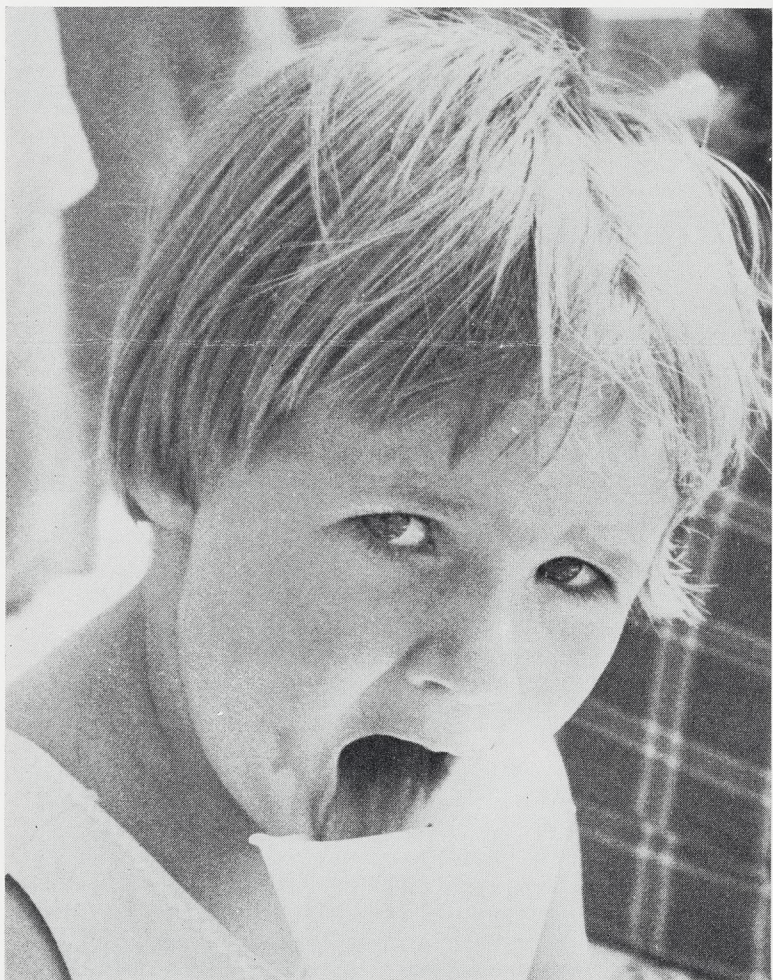


Bud Ulf, office manager and engineering coordinator for Northrop at JPL, chats with receptionists in lobby, which is first stop for all new Northrop employees at JPL. Receptionists are (from left) Nancy Hewitt, Mary Hite and Vickie Westphal.



Bee 'Invasion' No Prob

Warm Weather, Good Turnout Make



1000 Attend Vasa Park Fun Day

To revive an outmoded cliché, about 100 of the 1000-plus persons who attended the annual Northrop Ventura Picnic recently must have felt that they were "stung."

They were, in fact, stung. Bees in the Vasa Park area were fairly numerous, and apparently equally active, but park officials later said an extermination program has begun against the insects.

But even the stings didn't bother the picnickers for long, as they consumed great numbers of hot dogs, hamburgers and soft drinks and participated in a myriad of varied activities.

A women's softball game started things in the morning, with the Northrop Ventura team losing to a Van Nuys team, 4-2.

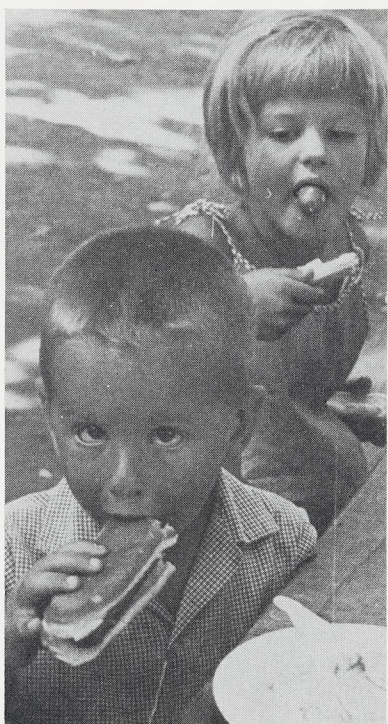
While children were kept busy by puppet shows, clowns, a ferris wheel and trained mon-



Photos by

Problem for Picnickers

Make Annual NVRC Event Success



keys, their parents were occupied in such adult activities as:

A men's girdle race, in which participants had to run to the center of a circle, put on a rubber girdle and run to the finish line.

A pop-bottle contest, in which wives had to fill pop bottles with water, while the bottles were balanced on the foreheads of their husbands. The men were lying on their backs.

A nail-driving contest.

A husband-and-wife wheelbarrow race.

Most of the picnickers arrived before noon (the event began at 10:30 a.m.), and stayed almost to the 5 p.m. closing time.

The weather was a factor in this, as temperatures were in the mid-70's. Many of the picnickers spent most of their time in Vasa Park's swimming pool.

Aptly enough, Raymond Sherwin of Planning guessed that there were 8652 beans in a huge jar on one table. The actual count was 8653. Mr. Sherwin admitted that his estimate was more of a calculation than a guess.



Photos by Dan Cashier and Jay Berman

AD ASTRA PER ASPERA

International Award Won By Lifting Body Test Pilot

Milton O. Thompson has received the 1966 Ivan C. Kincheloe Award as the world's outstanding experimental test pilot of the year.

The award, presented by the international Society of Experimental Test Pilots (SETP), was given "in recognition of outstanding professional accomplishment in the flight testing" of the Northrop-built M2-F2 lifting body.



Mr. Stanley

Mr. Thompson is chief lifting body project pilot for NASA's Flight Research Center.

Vice President Hubert H. Humphrey presented the Kincheloe Trophy to Mr. Thompson in private ceremonies held in Washington, D.C.

Films of this presentation were shown at the SETP's 10th Symposium and Banquet held late last month in Beverly Hills.

General chairman of this affair, the 10th annual "Report to the Aerospace Profession," was Max R. Stanley, Northrop Norair's chief of Flight Support Operations and a charter SETP Fellow.

Taking part were representatives of many nations who make up the 860-member organization.

The Kincheloe Award, named for the late Captain Ivan C. Kincheloe, a former Air Force test pilot who was scheduled to be chief of flight operations for the X-15 before he lost his life in an aircraft accident, is presented once each year in recognition of outstanding

professional accomplishment in the conducting of flight tests.

Mr. Thompson early this year made the first flight in the Northrop-built M2-F2 lifting body, the world's first all-metal vehicle now being used to establish technology needed for the design of future spacecraft capable of maneuvering in flight to a ground landing under pilot control. He has subsequently made other M2-F2 flights.

Mr. Thompson is also recognized for significant engineering and design contributions for the M2-F2 vehicle.

He is also currently scheduled to make the initial flight of the HL-10, the second of two lifting body vehicles Northrop Norair has produced and delivered to NASA.

People in the News

London, New York and Kyoto, Japan, are among the cities throughout the world where Northrop Corporation personnel have traveled in recent months to present technical papers.

London was the destination of Andrew Wortman in September when he presented his paper, "Experimental Investigation of Distributed Injection Near the Stagnation Point in Hypersonic Flow." The presentation was made to the Royal Aeronautical Society Congress.

R. E. Herfert was in Kyoto in September, delivering "The Effect of Cyclic Stress Creep on Close Packed Metals," to the sixth International Conference for Electron Microscopy.

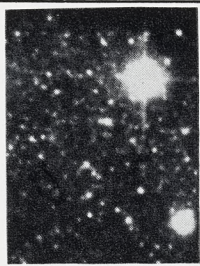
W. W. Harter was in New York City attending the fifth annual Reliability and Maintainability Conference. He presented a paper titled "Reliability Application of AFM 66-1 Maintenance Data."

Five Northrop men were contributors to the American Welding Society's national meeting this month in St. Louis. Their three papers were presented there and were submitted for reprinting in the AWS Welding Journal.

Laurence H. Stone, A. H. Freedman and E. B. Mikus contributed "Recrystallization Behavior and Brazing of the TZM Molybdenum Alloy." Mr. Stone also presented "Brazing of Tantalum Alloy Honeycomb Structures." K. C. Wu and Mr. Herfert collaborated on "Microstructural Studies in the Rene' 41 Simulated Weld Heat-Affected Zones."

Four representatives from Northrop participated in the Institute of Electrical and Electronic Engineers' (IEEE) Aerospace Systems Conference in Seattle.

Robert R. Dye submitted "The Influence of" (See AD ASTRA, page 5)



SEVEN F-5 PILOTS AWARDED DFC'S AT WILLIAMS

Seven U.S. Air Force combat veteran fighter pilots were awarded the nation's highest aerial achievement award—the Distinguished Flying Cross—recently at Williams Air Force Base, Arizona, for extraordinary achievement while flying the Northrop-built F-5 in Vietnam.

The awards were made for "exceptional flying ability, leadership and outstanding initiative that were instrumental factors in the highly successful evaluation of the F-5A weapons system." Maj. General Henry G. Thorne, jr., commander, 12th Air Force, Waco, Texas, presented the awards.

The Joint Service Commendation Medal was presented to Major Donald F. Crane of the 4441st Combat Crew Training Squadron for his unusual accomplishments in the Military Assistance Program (MAP), delivery and training operations, of the F-5 in Ethiopia.

Training of allied pilots under MAP, in the combat application of the F-5 Freedom Fighter, is the primary mission of the 4441st.

Receiving the Distinguished Flying Cross were: Lt. Colonel Alfred H. Hopkins, jr., commander, 4441st; Major Duane L. Carpenter, Operations officer, who was also the first pilot to log 500 hours in the F-5; Major Ronald J. Crozier; Captains Miles E. Withrow, Robert P. Whitener, Harold J. Huffman and Louis G. Rever.

The seven DFC award recipients are original members of the F-5 Skoshi Tiger unit which trained at Williams AFB. Officially known as the 4503d Tactical Fighter Squadron (provisional), it consisted of 12 aircraft which entered the Vietnam conflict in October 1965.

Following the completion of the Skoshi Tiger evaluation operation in March of this year a new unit of F-5's was formed by the USAF and designated the 10th Fighter Commando Squadron.



Northrop's Hal Hendersen built the Hard Cash Saloon in his back yard to house unique bottle collection, then built ghost town to house unique saloon.

BOTTLES

(Continued from page 2)

ive, it has not dimmed their love of bottles. They are still fascinated by each new find. They have more than 5000.

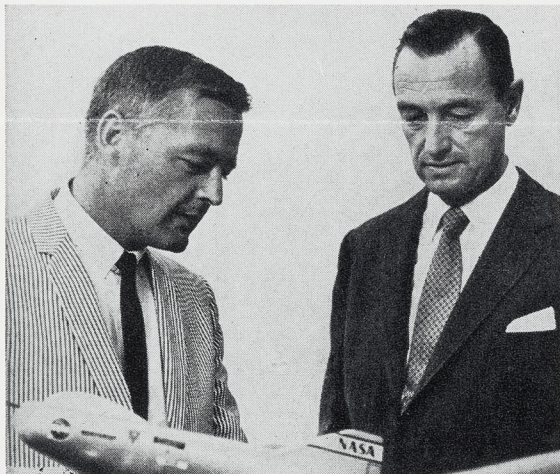
They like to show their liquor and beer bottles of every size and shape imaginable; old bitters bottles, equally assorted, held "tonics" often more potent than liquor but acceptable to temperance-minded families; pumpkin-seed bottles of varying sizes were the forerunners of flasks; and "talking" bottles with imprinted advertisements for their contents, usually medicines.

In the year he has been with Northrop, Mr. Hendersen has found other ghost town enthusiasts.

They are among groups of interested people now invited to "Iona City" as time permits. The Hendersens especially like to entertain youngsters and to acquaint them with the history of each relic.

"Iona City" will never be complete, Mr. Hendersen says. As long as items can be found, it will grow.

In the planning stages now are a "Boothill Cemetery"—sans inhabitants — and a reduced size, five stamp mill.



CONGRATULATIONS—Northrop President Thomas V. Jones (right) congratulates NASA test pilot Milton Thompson on his selection to receive Ivan C. Kincheloe Award for 1966.

SPACE: Pasadena Contingent Shares in Historical Engineering Efforts

(Continued from page 3)

accuracies of JPL's worldwide Deep Space Net which utilizes tracking and communications stations at Goldstone, California; Johannesburg, South Africa; Woomera and Canberra, Australia; and Reblede, Spain.

In the same section Pete Lau is a scientific programmer, and Phil Grondin provides engineering support to the Space Flight Operations facility and Data Systems Development section.

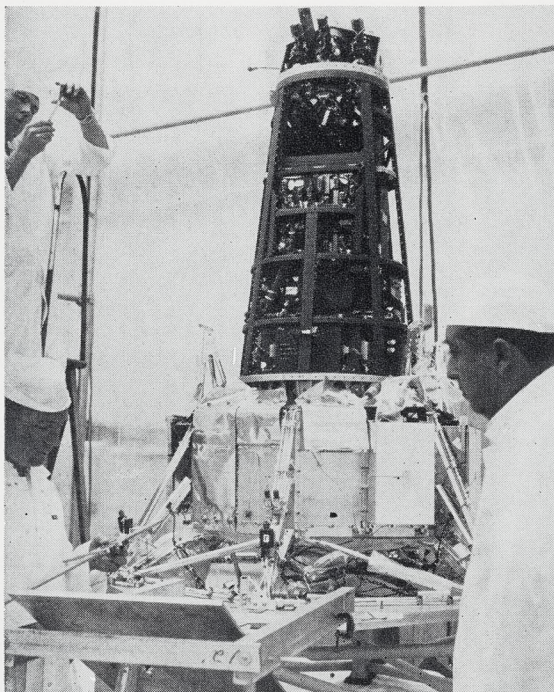
The Mariner Venus program has more Northrop people than any other at JPL. Harold Bigelow, assigned to the Environmental Requirements section, is establishing test conditions for the spacecraft. Shirley Delgado is assisting in reduction, compilation and graphing of data from vibration, shock and acoustic tests of spacecraft hardware.

In the Space Instruments section, Marshall Fong, Al Kanze and Tony Hedrick are performing engineering, test and checkout tasks on the vehicle's data automation system.

In the Lunar and Planetary Instruments section, Gino Vitkus is performing thermal analyses on the Surveyor seismometer experiment. Winston Flood recently completed an assignment in the Lunar and Planetary Sciences section where he was analyzing radar return signals in tests which will prove helpful in a JPL-sponsored technique for sounding planet surfaces.

Many other Northrop specialists are assigned to sections which serve more than one spacecraft.

In the Guidance and Control division, there is Clay Enoch, Charles Fuller, Temple Gilliam, Bob Lawrence, Jim McKinlay, Dima Karpenko, Phil Presser, Martin Rojas, and Nate Vilensky, who analyze and design flight



Out of the history book comes this view of a Ranger spacecraft during final assembly and inspection, with Marty Rojas, a Northrop engineer, at right.

computers, spacecraft power systems and guidance/control systems.

JPL's Electro-mechanical Engineering Support section has Tony Aveni, Larry Conley, Wallace Cook and Rudy Wakefield. Bob Fee works in Materials Research. Vic Jaworski and Oscar Shev are assigned to lunar spacecraft development.

Mark Christensen, who is president of the Los Angeles Chapter of the Institute of Environmental Sciences, exercises quality control over electronic parts. Paul Ripley engineers electrical systems for various spacecraft.

At least five Northrop men will follow their respective spacecraft to Cape Kennedy for launch. Assigned to the System Test and Launch Operations section are Tom Laney, Jim Lasley, Bob Miller, Harold Varley and Merlin Giefer.

Two Northrop systems engineers—the aforementioned Bob Rubinstein and John Meyer—are looking beyond the existing planetary and lunar programs to the 1970-1990 decades.

Assigned to the Future Missions group of JPL's Project Engineering section, the men are studying possible unmanned probes to Mercury, Jupiter and the planets beyond.

With Northrop people scattered throughout the JPL organization, a mammoth job of providing administrative and personnel services on location falls to Bud Ulf, manager of the Northrop office at the Laboratory.

Mr. Ulf is engineering coordinator and, as such, assists in coordinating JPL's support requirements with Northrop's available manpower and is the direct link between JPL technical supervision and Northrop Support Operations.

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

For Sale

Guitar, Gibson elec., dble. pickup, \$275 value, \$200. Gardena, 324-7442. A

Bicycle, boy's 24", 3-spd., just o/hailed, new tires, tubes, fenders, chain guard, \$23. Huntington Bch., 714-842-5681. A

Chevy II, 1963, p/s, b/seats, r/h, 1-owner, \$1450. Torrance, 325-6546. A

Pickup Truck, 1949 Studebaker, '52 Chrysler eng., 350 cu. in., Chrysler trans., Merc. rearend, htr., 12 volt elec. sys., \$335. Torrance, 354-6563, 438-1879. A

Bow, Shakespeare Wonderbow, mod. 31A-X15, left-hand, full working recurve, contour handle, draw wt. 45 to 50 lbs., length 69", quiver & tips incld., \$65. Orange, 714-639-1785. A

Camera, speed graphic, 4 x 5, many extras, \$180. Orange, 714-637-5855. A

Ford, 406 Spec. Galaxie 500, 2-dr. sedan, new eng., solid lifters, 3 pr. carbs., 4-spd. trans., \$1650. Inglewood, OR 7-7355. A

Bicycle, girl's 26" Schwinn, 3-spd., hand brakes, \$18. Torrance, 371-1096. A

House, 4-bdrm., family rm., 2 1/2 baths, 1-acre, horses OK, near Northrop Ventura, \$35,000. Somis, 805-482-1186. A

House, 3-bdrm., den, 1 1/4 baths, in Hollywood, \$1750 down, \$23,600. Torrance, PL 4-2286. A

Tuner, Sherwood AM-FM, \$50. Redondo Bch., FR 9-1804. A

Dryer, 1964 Kenmore, 220 volts, used 8 mos., \$70. Hawthorne, 675-7928. A

Pontiac, 1966 Tempest sport coupe, 8-cyl., auto. trans., r/h, 7700 miles, new car warranty, \$2250. Lawndale, 370-3821. A

House Trailer, 38' x 8' Stewart-Coach, furn., full bath, refrig., butane stove, new awning, \$995. Hermosa Bch., 374-3638. A

Surfboard, Dave Sweet, 9'9", wooden stringers, never used, \$45. Lawndale, 679-2642. A

Vacuum, G.E. canister-type, reconditioned, new hose, all attachs., wheels & swivel top, \$25. Torrance, 327-8226. A

Lot, commercial acre, in Hesperia, \$3250. Torrance, 370-4641. A

Washer & Dryer Comb., Philco Bendix, \$40. Torrance, 329-6748. A

Home, 3-bdrm., fam. rm., 1 1/4 bath, all bltins, cpts., dps., sprinklers, softener, patio newly painted, \$27,500 or lease \$235. Hollywood, 323-8657. A

Dodge, 1951, 4-dr. sedan, 39,000 act. miles, stick shift, new paint, 2 new tires, \$175. Inglewood, PL 5-8158. A

Ice Box for 100# Mobilair camper, used twice, \$15. Hawthorne, OS 6-8842. A

Falcon Station Wagon, 1961, 4-dr. deluxe, r/h, w/s/w, auto., new eng., \$750. Torrance, DA 5-7705. A

Dishwasher, GE Mobilemaid, 1965, \$125. Torrance, 326-6195. A

Sailboat, Lido-14, w/trailer, cover, many extras, financing avail., \$1250. Manhattan Bch., FR 4-4780. A

Surfboard, Jacob, 9', good for beginners, \$70. So. Gate, 633-4477. A

Boat, 14' Burchcraft outboard w/lights, steering, cover, \$100. Torrance, DA 3-7544. A

Falcon, 1962, 4-dr. sedan, auto. trans., deluxe model, \$675. Chatsworth, 882-0761. A

Honda 160, 1965, low miles, \$400. Box 2001. A

Fairlane, 1957, p/s, p/b, p/w, rebilt. auto. trans., new w/s/w tires, r/h, \$295. Artesia, 860-3122. A

Pontiac, 1937, cpe., classic, 71,000 act. miles, new tires, rest of car all orig., \$225. Hawthorne, 678-6027. A

Renault Dauphine, 1959, new tires, brakes, battery, gen., recent motor o/haul, \$150. San Diego, 648-2939. A

Rifle, 30-06 Winchester, model 70, w/adjust. Weaver scope, 2 3/4 to 5 power, case, \$125. Torrance, 830-4332. A

Jaguar, 1954 XK120 sport roadster, roll bar, wire wheels, motor & trans. o/hailed, new top, upholstery & tonneau cover, \$795. Gardena, DA 4-9593. A

Corvair Corsa, 1966, 4-spd., supercharger, fully equipped, take over \$66 mo. pymnts., \$2350. No. Long Beach, 422-3253. A

House, 3-bdrm., den, new birch kitchen, cellar, 2-car gar., 2 rms. upstairs, close to beach, \$145 mo. rent or \$29,950. Hermosa Bch., FR 9-7342. A

Supercharger Judson for VW, all parts & instructions, \$85. Lomita, 326-0221. A

Tape Deck, Bell 4-track stereo play/record, Knight factory aligned/tested stereo recording pre-amp, has all features, \$200. Redondo Bch., 379-4559. A

Bicycle, girl's, includ. metal basket, \$15. Gardena, 327-2598. A

Yamaha, 1964, 80 cc, new trail sprocket & chain, o/sized rear tire, \$250. Hawthorne, 679-4237. A

Piano, baby grand, Bush & Lane, w/bench, plain design, dark, \$450. San Pedro, TE 3-4191. A

House, 3-bdrm., 2-bath, den, fireplace, next to school & golf course, \$25,900. Torrance, 375-6071. A

Love Seat, Lawson, salmon pink shade, \$75. Torrance, 371-4056. A

For Sale

Rifle, custom-built 30.06 '03A3 Sporter, hand inlitted, fancy-grade Monte Carlo stock w/ 4X scope, recoil pad & sling, cost \$300; \$225. L.A., 635-6055. A

Comet, 1960, 4-dr., stick, eng. o/hailed, new ignition, \$450. Downey, 923-7690. A

Alfa Romeo, 1961 Super Spyder rdstr., 2 new tires, \$950. L.A., 645-5158. A

Sprite Parts, comp. head, sup. carburetors & disc brakes, \$200, or sell sep. Port. Bend, 377-2921. A

Lot, wooded at Snow Summit Ests., Big Bear Lake, 80' x 100', utilities in, financing avail., \$6950. Fullerton, 714-525-1677. A

Buick Invicta, 1961, h/top cpe., air, w/s/w, p/s, p/b, auto. trans., b/seats, 58,000 miles, \$995. P.V. Pen., FR 7-6458. A

Refrigerator, Admiral, 2-dr., 5 yrs. old, \$75. Gardena, 644-1485. A

Chevrolet, 1957, 2-dr., h/top, V-8, auto., r/h, other extras, \$450. L.A., 645-0475. A

Piano, Espey console, model 1957, spinet w/full keyboard, mahogany finish, \$500. Compton, 672-1422. A

Exerciser Bike, handle bars move back & forth, seat height adjusts, dual action, \$10. Torrance, DA 9-2016. A

Motorcycle, Harley Davidson 74, 1961, new paint & tune up, \$550. P.V. Ests., 378-0603. A

Dinette Suite, blonde, modern, buffet, table w/custom pad & 6 chairs, \$35. Playa del Rey, 823-1787. A

Shotgun, over & under, European custom, selective ejectors, \$135. Rossmoor, GE 1-7696. A

Power Mower, Craftsman, reel-type, \$20. P.V. Pen., 377-9842. A

Cadillac, 1958, full power, factory air, \$350. L.A., 670-6237. A

Clothing, young man's, sport shirts, 14 1/2 & 15, trousers, continentals & newest styles, 29 waist, 29 length, shirts, \$1 ea., trousers, \$3. Inglewood, OS 6-1475. A

TV, 19" table model Emerson, wood cabinet & in working condition, \$25. Torrance, DA 6-4898. A

Transmission, Chevy Power Glide, \$50. Hawthorne, 679-5371. A

Pickup, 1963 Falcon Ranchero, 6-cyl., 27,000 miles, new tires, 1-owner, \$1250. Torrance, 375-3728. A

Silverware, silverplate setting for 8 w/case, \$9.90. Hawthorne, 676-0418. A

Pontiac, 1963 Tempest, 2-dr., p/s, factory air, V-8, auto., 2 new tires, \$1200. Inglewood, OS 6-0049. A

Chevy II, 1963, super sport, 6-cyl., w/chrome wheels, b/seats, auto. trans., \$1395. Gardena, 323-6759. A

Camera, Mamiya, auto., 16mm, \$40. Torrance, FA 8-3306. A

Guitar, elec., Fender Stratocaster & case, \$225. Torrance, 371-9925. A

Acreage, 10 acres, near Rosamond, \$950 down & take over pymnts. at 6% interest, \$5950. Torrance, FR 8-1026. A

Trailer, 2-wheel enclosed, 5' x 8', new tires & wheel bearings, \$125. Inglewood, 672-0877. A

Movie Camera, Jelco 8-EC-1 8mm cine, 3-turret lenses, bltin exposure meter & filters, pistol grip, leather carrying case, \$25. P.V. Ests., FR 7-2294. A

Thunderbird, 1956, \$1200. Hawthorne, 675-7381. A

Buick, 1956, \$200. Inglewood, 370-3023. A

Bicycle, girl's 3-spd., 28", \$20. Redondo Bch., FR 5-8804. A

House, 3-bdrm., 1-bath, cpts., dps., patio, \$22,500. Torrance, 326-4839. A

Falcon Futura, 1965 station wagon, still under warranty, air cond., auto. trans., r/h, \$1950. Placentia, 524-1686. A

Honda, 1963-64, Dream 300 mod. to 350 cc, lge. handle bars, auto. starter, \$400. Gardena, DA 4-0649. A

Stove, gas, Wedgewood 36", white, w/broiler, oven & storage space, \$30. Anaheim, 635-3315. A

Washer, deluxe Frigidaire auto., white, \$115. So. Pasadena, 254-8973. A

Home, 4-bdrm., fam. rm., 2-baths, all bltins, incl. auto. dishwasher, fenced & landscaped yd., 70 x 150 lot, 1 mile from Research Park, 5 1/2% existing loan, \$39,000. P.V., 377-5172. A

Power Supply, 12 volt d.c. & 18 volt a.c. output, 110-115 volt a.c. input, for lge. model railroad or slot car track, 12 amp. rated, \$15. Box 2002. A

Mercury, 1956, 4-dr. h/top, auto. trans., p/s, p/b, r/h, 2 new tires, new battery, rebilt. p/brake unit & radiator, \$295. P.V. Ests., 373-1013. A

Bed, dble, walnut finish h/wood, half canopy, Simmons innerspring mattress & box springs, \$75. Sherman Oaks, ST 8-9709. A

Honda, 1966 305 Scrambler, 2 mos. old, assume \$43 mo. pymnts., incl. full insurance, no equity, \$946 approx. bal. Box 2003. A

House, 3-bdrm., 1-bath, cpts., dps., newly painted, lot 50 x 150, dble. detached gar., \$24,500. Hawthorne, 675-2315. A

Rocking Chair, early Amer., w/pads for seat & back, \$15. Torrance, 375-6467. A

Bench Drill, Atlas 15", 1/2" Jacobs chuck, \$60. Rolling Hills, 377-2200. A

For Sale

Crib & Mattress, wood retractable sides, \$55. P.V. Pen., 377-9666. A

Mobile Home, 2-bdrm., 10 x 50, furn., \$2295. Orange, 714-532-1361. A

Outboard Motor, 5 h.p. Clinton, \$65. Huntington Bch., 897-6992. A

Movie Projector, 8mm Bolex, 18-5, \$75. P.V., 377-5059. A

Dodge, 1961 station wagon, 3-spd. trans., p/s, p/b, factory air, \$795. Long Bch., 597-1788. A

Buick, 1956, 2-dr., h/top, p/s, p/b, auto. trans., \$175. Rolling Hills, FR 7-1404. A

Motorcycle, 1963 Triumph, 650 cc, \$700. Cypress, 828-5943. A

Pool, 18' x 4', pump, filter, ladder, \$75. Rolling Hills Ests., 377-0114. A

Dodge Dart GT, 1963, 6-cyl., h/top, \$1250. Manhattan Bch., FR 6-6848. A

Wig, hand-tied shoulder length, blond, adjus. size, cost \$125; \$50. Gardena, 324-0215. A

Travel Trunk, \$10. P.V., FR 7-6435. A

Auto Top Carrier, 42" x 42", water-proof, \$25. San Pedro, TE 3-9253. A

TV Set, Zenith, 1963 23" console w/remote control, \$125. L.A., 656-0201. A

Airplane, Cessna 140, all metal, C-90-12F 1150 on remf/g, LTRA-6 w/ILS & MKR BCN & Lightcraft Model 66 radios, post lighting, full gyro panel, wheel exts., \$2400. Orange, 714-532-1510. A

Home, 4-bdrm., 3-bath, lge. cathedral living rm., located 1 mile from all 3 P.V. schools, \$56,000. P.V., 377-6100. A

Oldsmobile, 1957, 2-dr., h/top, auto. trans., p/s, p/b, r/h, air cond., J-2 kit avail., 50,000 miles, orig. owner, \$399. P.V. Pen., 377-6124. A

Pickup, 34-ton Chevrolet, 1954, new tires & new rebilt. eng., \$260. Gardena, OS 5-2159. A

Honda, 55 cc, 1964 trailbike, spark arrester & bell helmet, low mileage, \$250. Hawthorne, 676-3886. A

Furniture, 3-pc. provincial living rm. set, wing back, w/ruffled flounce, sofa, tangerme, 2 chairs, avocado green, \$250. Lawndale, 675-3957. A

Yamaha 80, 1965, extras, low mileage, \$225. Hermosa Bch., FR 2-1895. A

Formal, sky blue, floor length w/half slip, sheath style w/empire waist, size 10, \$25. Lawndale, 676-3050. A

Chevrolet, 1957 Bel Air, 4 new tires, new paint, brakes & motor, \$650. Lawndale, OS 5-2978. A

Desk, 7-drawer, maple, matching night stand, \$25. L.A., AX 4-0727. A

Oldsmobile, 1964 F-85 station wagon, p/s, p/b, p/tailgate wind., air cond., 2 new tires, r/h, \$1950. Inglewood, PL 4-7861. A

House, 3-bdrm., 1 1/4 bath, E. Anaheim, GI loan avail., \$25,900. Anaheim, 774-6590. A

Dishwasher, port. auto., deluxe pushbutton GE, \$110. Diamond Bar, 595-5877. A

Chevrolet, 1958, 348 cu. in. eng. 409 rac. clutch, Muncie 4-spd., Hurst 4.56 posi., hvy. duty springs & shocks, stereo & tapes, p/s, p/b, radio, many other extras, \$1950. Inglewood, 677-1495. A

Kittens, Siamese, seal point, 2 males & 3 females, pure bred, fem. \$15, males \$20. Hawthorne, 677-7224. A

Boat, 14' runabout, factory-blt., hull pressed fiber, 25 h.p. Evinrude motor & trailer, \$295. Gardena, DA 4-8853. A

Guppies, male & female, good markings, .20¢ ea. or 3 for .50¢. Torrance, 324-2992. A

Honda, 305 Scrambler, 1965, metal flake, blue tank, swinging arm body; chrome front & rear shocks, many extras, \$600. Inglewood, 674-5442. A

For Sale

Motorcycle, Spanish 1965 Bultaco-Mercurio, 175 cc, 2500 miles, \$400. Inglewood, PL 6-7681. A

Ford, 1965 Galaxie convt., 352 eng., 4-bbl. carb., new tires, 25,000 miles, \$1995. L.A., PL 6-2587. A

Table, 30" round, mahogany, Duncan Phyfe lamp table, \$10. Gardena, OS 5-5258. A

Wheels, 2 14" chrome reverse, Ford 5-Lug, \$25. Torrance, 320-2002. A

Pontiac, 1966 Tempest, custom V-8 auto., p/s, p/b, r/h, 6600 miles, \$2350. P.V. Pen., 377-6528. A

House, stucco, 2-bdrm., full dining rm., fireplace, cpts., dps., dble. gar., lot approx. 45 x 145, \$20,950. Inglewood, OR 1-3860, FR 5-5097. A

Mattress, box spring, dble. ortho. 5-dwr. dresser, night stand, bookcase headboard, \$65. Anaheim, 774-2779. A

Furniture, 5 rms.; washer, Kenmore delux, \$40; dinette set, 4 chairs, \$15; other items various prices. Long Bch., 429-4349. A

Acreage, 5-acre parcel, in Hi-Vista desert area, approx. 14 miles so. of Edwards AFB, has small weekend cabin, \$3000. P.V. Pen., 377-6434. A

Living Room Couch, \$40. Torrance, 378-0094. A

Piano-Accordion, Frontalini, w/case, \$90. Hawthorne, 679-9658. A

Wanted to Buy

Chevelle or Chevrolet, 1963-1965, must be in good condition & priced reasonably, cash. Inglewood, 755-1071. B

Blue Chip Stamp Books. L.A., 463-9340. B

Rentals Offered

Exec. Home, Hollywood Riviera, close to South High School, 4-bdrm., 2 baths, lge. family room, bltins, cpts., dps., dishwasher, \$300. Torrance, DA 6-1205. E

Cabin, A-frame, at Big Bear Lake, Moonridge area, sleeps 6 adults or 4 adults w/children, 1 block from golf course, swim. pool & riding stables, \$30 w/end; \$80 wk. P.V. Ests., FR 7-3888. E

Cabin, Lake Arrowhead, close to lake & village, fireplace, all modern, \$25 w/ends; \$55 wk. L.A., 761-9645. E

Apt, 1 or 2-bdrm., furn. or unfurn., cpts., dps., heated pool, near Norair, \$105 & up. Gardena, 321-0928. E

Apt, deluxe 2-bdrm. unfurn., lge. pool & patio, cpts., dps., bltins, closed gar., near El Camino, \$120. Torrance, DA 9-5986. E

Apt, 1-bdrm., unfurn., bltins, pvt. deck, closed gar., hobby shop, hot water & trash pd., \$95. mo. Torrance, FR 5-0867, 320-7547. E

Apt, 2-bdrm., bltins, dps., 1 1/2 bath, close to schools & transportation, \$110 mo. L.A., OR 0-4473. E

Cabin, Big Bear Lake, mod., sleeps 7 to 9, \$18 w/end; \$50 wk. Bellflower, TO 7-0662. E

Apt, 2-bdrm., 1 1/2 bath, unfurn., cpts., dps., bltins, near schools & recreation, \$125. Inglewood, 644-2565, 672-1890. E

Studio Apt, 2-bdrm., 2 1/2 bath, pvt. deck, sub. gar., cpts., dps., dishwasher, elec. bltins, near San Diego Fwy., adults, lease, \$180. Inglewood, 673-0615. E

Apt, 1-bdrm., furn., all bltins, pvt. deck, lge. pool, ample sub. parking, near Northrop, \$135 mo. Lawndale, 679-2117, 670-6084. E

Apt, unfurn., 2-bdrm., pvt. gar., redecorated, tile kitchen & bath, disp., water & trash pd., baby OK, no pets, \$110. Hawthorne, OS 5-8335. E

Apt, delux, 1-bdrm., pool, bltins, \$95 mo. Redondo Bch., 376-2117. E

AUSA DISNEYLAND TICKETS AVAILABLE

A full evening (8 p.m. to 1 a.m.) of Disneyland attractions for only \$3.75 is still being offered Northrop employees and their families on October 28.

That's when the Association of the United States Army has reserved the fun center. Northrop families have been issued a special invitation to take part. Tickets may be obtained through normal ticket outlets.

Rentals Offered

Apt, 1 & 3-bdrm., 2 bath, 3 blocks from Redondo King Harbor, cpts., piped music, bltin vacuum, gar., storage, \$105. Redondo Bch., FR 6-9608. E

Vacation Cottages, Idyllwild, 1 & 2 bdrms., sleeps 6, fireplace, patio, stream, \$20-\$35 w/ends; \$45-\$65 wk., L.A., PL 4-5288. E

Child Care Offered

Baby Sitting, my home. Inglewood, 672-1952. G

Personals

To his friends & acquaintances at Northrop whom he had known for such a short while, we, his family, wish to express our sincere appreciation for the cards, messages, & flowers at the time of his passing. MRS. GEORGE CLEMENTS & CHILDREN. L

Ironing, my home, \$1 hr. Hawthorne, 644-2440. L

I wish to extend thanks to all my friends at Northrop for remembering me while I was in the hospital in Chester, Calif., on my way home from Alaska. Your cards, letters & planters meant so much to me at that time & I will never forget your thoughtfulness, this includes the NRC staff, Retiree Club & the Gem & Mineral Club. HOWARD CONVERSE. L

My thanks to all those wonderful gals & fellows who were so kind to me when I left the Norair Engineering Center for our Anaheim facility. I love the country out here, but I miss you all very much. ELLA ARMSTRONG POST. L

Wanted for distressed family; 1 set bunk beds & 1 dble. bed, springs & mattresses. Children & parents sleeping on floor. Contact Welfare Coordinator, Norair, ext. 4786. L

The family of Marlana F. Goodwin wishes to express sincere appreciation to all the Northrop friends for the kindness & sympathy extended at the recent passing of our beloved daughter. L

For Sale or Trade

Pickup, 1949 Ford, 3/4-ton, '57 eng., 6-cyl., \$175, or trade for welding equipment, metal working machinery, compressor, or guns. Hawthorne, OS 9-3476. M

TR-4, 1963, new tires, o/drive, \$1500, or trade for car of same value. Fullerton, 714-871-5617. M

House, 3-bdrm., 3-bath, formal dining rm., family rm., dble. gar., workshop, 7 yrs. old, Cape Code style, \$55,000 or trade for home in Orange County. Miraleste, TE 3-5515. M

Going my way?

Rides Wanted

7:30 a.m. — 4:12 p.m.

So. Birch Ave. & 118th, Hawthorne. G. Lees, Norair, ext. 1131, 675-1471.

El Toro Area, El Toro. R. Steed, Norair, ext. 1038, 837-8963.

Rides Offered

7:30 a.m. — 4:12 p.m.

El Toro Area, El Toro. R. Steed, Norair, ext. 1038, 837-8963.

AD ASTRA PER ASPERA

(Continued from page 4)

Airplane Pre-Delivery Test Policies upon System Reliability."

Mr. Wortman presented "Two Methods of Aerodynamic Testing in Hypersonic Wind Tunnels."

Trevor A. Robinson presented "Choosing the Electric Power System for a Short Range Missile."

And J. W. Murphy wrote and submitted "Conductor Shielding for Lo-Hi Electromagnetic Interference."

Two Northrop men—W. F. Sharpe and John K. Stauffer—were representatives to the sixth national Conference on Environmental Effects on Aircraft and Propulsion Systems, held in Trenton, New Jersey, in September.

Mr. Sharpe's paper was titled "Minimizing Gun Firing Effects on the F-5 Propulsion System." Mr. Stauffer's was "Electrical Anti-Ice Windshield Analysis."

In San Francisco early this month, three Northrop men combined to present two papers, before the National Association of Corrosion Engineers.

A. H. Freedman and M. Katcher co-authored

"Development of Hydrostatic Pressures in Liquid-Filled Cracks." T. R. Croucher wrote "A Comparison of Stress Corrosion Testing Techniques and Environments for Precipitation Hardening Stainless Steels."

D. P. Wilhelm was in Atlantic City, New Jersey, presenting "Investigation of Cyclic Crack Growth Transitional Behavior" to the American Society for Testing and Materials Fatigue Crack Propagation Symposium.

His following paper, "Crack Propagation and Stress Intensity Interrelationships Accompanying Fatigue of Sheet Materials," will be presented in Pittsburgh next month to the Society for Experimental Stress Analysis.

F. W. Peitzman was in Hampton, Virginia, delivering "Development of a Bellmouth for the Trisonic Circuit of the Northrop Norair High-Speed Wind Tunnel Facility" to the Supersonic Tunnel Association.

Joe Der, jr., was co-author of "Studies on Laminar and Turbulent Free Shear Layers with a Finite Initial Boundary Layer at Separation." He did not attend, but the paper was given in Brussels, Belgium, to the AGARD Specialists' Meeting on Separated Flows.

Movie Team Accepts 'Indy' At Banquet

The "Indy" has come to Northrop Ventura.

The "Indy," a plaque presented by Industrial Photography Magazine, was presented in honor of "The Last Five Miles Home," a color film produced by Ventura on the Apollo Earth Landing System.

Tom Smalley of the Ventura Motion Picture department accepted the award on October 1 at a banquet of the Association of Cinema Laboratories, in Los Angeles.

Mr. Smalley edited the 18-minute film, selected its background music and photographed most of the footage.

The magazine named the movie "best in class" in the 1966 Industrial Film Awards competition. "The Last Five Miles Home" traces the Ventura-built Apollo ELS from fabrication at Ventura to a drop test at El Centro.

Lou Florence, in charge of logistics for the Apollo Project office, assisted in the technical production of the film, and Henry Still, manager of Public Relations, wrote the script.

Photographers Bob Thornton and Gil Nunn also took some of the footage.

Mr. Smalley was notified in September that the picture had won.

The film has been shown to employees at lunchtime, and to schools and service clubs.

CONEJO

(Continued from page 1)

ager of the Nortronics Applied Research department, was elected association treasurer at an organization meeting last month. Officers will serve on a rotating basis.

In addition to Ventura and NARD, association members are:

Westland Plastics; Westinghouse Astroelectronics Laboratory; Semtech Corporation; Aerospace Division of Purolator Products; W. S. Shamban and Company; The Talley Corporation; and Technology Instruments Corporation (TIC).

Barry Willis, vice president and general manager of Purolator, is the group's first chairman. C. G. Peterson, general manager of TIC, is secretary.

Representatives said their first project will be consideration of a plan to develop a joint supervisory training program for foremen.

Industrial firms in the Newbury Park area are eligible for membership if they have a minimum of 50 employees.

Norair Wins Contract To Design Jet V/STOL

National Aeronautics and Space Administration's Langley Research Center has awarded Northrop a study contract for the design of a jet V/STOL (vertical or short takeoff and landing) aircraft.

A parallel study contract was awarded to Republic Aviation division of Fairchild Hiller Corporation of Farmingdale, New York.

Results of the study are directed at development of an aircraft to be used by NASA in flight research on major deficiencies in the technology of jet V/STOL vehicles, according to Darrel Hirsch, Norair project manager.



THE 'INDY'—Northrop Ventura's Tom Smalley accepts "The Indy," a plaque honoring the movie, "The Last Five Miles Home," from television actress Casey Rogers. The movie, produced and directed by Ventura, traces the Apollo Earth Landing System from fabrication to test. The trophy was presented at the October 1 banquet of the Association of Cinema Laboratories. Industrial Photography magazine presented the award.

HOBBIES: Toys for Children Launched Peck in Unique Crafts

(Continued from page 1)

clears, they start running again."

Mr. Peck's interest in building clocks led him to join the National Association of Watch and Clock Collectors.

The waffle irons started leaving the Peck workshop a year ago, after Mr. Peck's brother asked him if he had the family's old non-electric waffle iron. He was going on a camping trip, and wanted to borrow it.

"I looked all over for it," Mr. Peck said, "but couldn't find it. I went to just about every hardware and appliance store between here and Fresno, trying to buy one. In the new stores, they had never heard of a non-electric waffle iron. In the old stores, they'd tell me they thought they had one around somewhere, but they never did. And none of the sales catalogues even listed them any more."

"Antique stores had them, but at ridiculous prices, so I made a wooden pattern and had it cast in a foundry. Since then, I've made three more, and I have another three at the foundry right now."

Mr. Peck's waffle irons differ from the old-fashioned irons in one respect. The old ones were made of cast iron. His are of

cast, copper-free aluminum.

"The heat transfer is far more even with aluminum than with iron," Mr. Peck said. "With a camping stove especially, where the heat is often concentrated, an iron waffle iron would heat in one spot and remain cool around it."

The hardwood handles on the waffle irons are made from the same madrona tree which supplies the makings for the clocks.

Mr. Peck gave one waffle iron to his brother; another, to his sister. Other friends had advised him to mass-produce them for sale.

"That wouldn't work," Mr. Peck said. "The castings cost me \$6 a set, and I put a couple of hours of labor in on each waffle iron besides that. I couldn't sell enough of them to break even."

Mr. Peck, his wife, Shirley, and three daughters have lived in Newbury Park for three years. He has worked for Northrop Ventura for 10 years.



ANIMALS AND WAFFLE IRONS—Donald W. Peck of Northrop Ventura is a man of divergent hobbies. He began by making stuffed animals for his daughters; then started building wooden clocks. A year ago, he made his first aluminum waffle iron. All three were exhibited through the past weekend at the Ventura County Fair. Mr. Peck is a senior electronic engineer.

(Photo courtesy News-Chronicle, Thousand Oaks)

TALK: Sound Control Must Accompany Growth

(Continued from page 1)

now 60 percent of the company's earnings come right back to provide the assets we use every day, assets like the new transport building at Hawthorne, our wind tunnels, our manufacturing and research facilities at all Northrop divisions," he said.

"To reach our goals for 1969 alone will require in the neighborhood of \$150,000,000 more assets—more tangible things that all of us work with," he said. "Earnings are the key that will make this possible."

To illustrate how earnings contribute to the company's growth, Mr. Jones pointed out that when Northrop was formed in 1940 it had 600 employees and assets of \$2900 per employee. Today with 18,500 employees, the company has assets of \$11,000 per employee. In the next three years Mr. Jones projected this figure will grow to over \$16,000 per employee despite a substantial rise in employment.

Golf Teams Place High in Conejo Play

Northrop Ventura's two teams in the Conejo Valley Industrial Golf League have finished in second and third place in the league.

One Ventura team finished just two points behind the first place team, and the other Ventura team was just one point behind that. Points are determined through matches won each week.

The league, which played its matches at the Los Robles Golf Club in Thousand Oaks, consisted of 10 teams, all in the Conejo Valley.

Although one Ventura team had eight men and the other had seven, only four from each participated in each match. In this way, each golfer did not have to play every week.

Members of the first Northrop team were Bernard (Bud) Montag, Joe Sliakis, Harold Bixby, Dick Kipp, Rex Fairless, Bill Strang, Herb Samuelson and Sam Westfall.

The second team consisted of Jay Schaeffer, Bob Rowlett, John Morrison, Leo Riley, Roy Nickerson, Gil Topp and Dick Donald.

With growth, the company must redouble its efforts in obtaining new business, new products, new developments, new technical ventures, he emphasized.

"Growing 10 percent from \$600 million in sales requires twice the effort it takes to grow 10 percent from \$300 million. It demands twice the new developments, twice the new advances, twice the new products."

"We intend to intensify these efforts," he said.

Mr. Jones gave the Management Club a breakdown of how the Northrop sales dollar is disbursed. The biggest share—52.7 cents—goes into payments to employees in wages, salaries and benefits. Suppliers receive 38 cents for materials and services. Taxes take 3.7 cents. Wear and tear on equipment takes 1.9 cents, and .7 of a cent goes to interest payments.

Only three cents out of the total sales dollar represented earnings, of which 1.2 cents was paid in dividends to shareholders in the year just concluded. This left 1.8 cents for use in the business for new facilities, working capital, and so forth.

Mr. Jones pointed out once again that earnings, sales and backlog established new records for the company in the financial year ended July 31 (Northrop News, September 29, 1966).

"All of you contributed a great deal to the results of the past year, and I want to recognize and thank you for it," he said.

OJT Eases Manpower Shortage

Seven new employees at Northrop Ventura are in the midst of a 120-hour training course which will prepare them to become plastic workers in the Plastic Products branch.

The course is the second of its type, administered and operated by Plastic Products to train personnel. Paul Stewart, a former leadman, has been the initial training supervisor. The succeeding instructor is Carl Shoemith.

The seven were hired as plastic worker trainees. They began the course on October 3 and will continue through October 21, Mr. Stewart said. Following the 120 hours (three full work weeks), they will work for a week under supervision of long-time employees.

The seven, all hired from the Conejo Valley and Oxnard areas, are Mary Jankins, Betty Donnell, Alma Arroyo, Arthur Lara, Tony Mata, Glen DeLorenzo and Frank Koontz.

The first group of five trainees, which received instruction from September 6 through 30, was schooled in all phases of plastic fabrication. The trainees — Jim Burks, Harvey Hunter, Bob Sheridan, Eddie Rangell and Mildred West—since have been included in Plastic Products operations.

"This training course permits us to utilize the local labor force while at the same time filling our own needs," an Industrial Relations official said.

NORTHROP NEWS

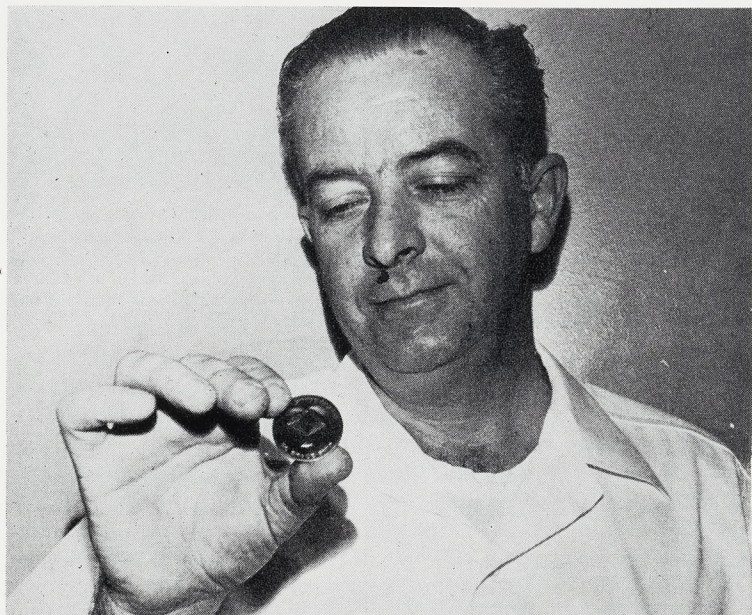
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Medal Commemorates Ventura Earth Landing System At Conejo Valley Show



A SILVER LIKENESS of the Apollo Earth Landing System is on one side of a commemorative medal, issued by the Conejo Valley Coin Club. Here Bob Wilson of Northrop Ventura, past president of the Club, examines one of the medals. The other side featured the historic Stagecoach Inn, a Conejo Valley landmark since 1876. The medals were cast both in silver and in bronze.

An image of Northrop Ventura's Earth Landing System has been struck in silver and bronze on a limited-issue commemorative medal, presented this month at the Conejo Valley Coin Show.

The medals, nearly the size of the United States silver dollar, were struck with consecutive serial numbers.

Bob Wilson, Ventura cafeteria manager and a past president of the Conejo Valley Coin Club, said orders for the medals have been received from throughout the United States and Canada.

"Only 112 silver medals were struck," Mr. Wilson said, "and just a few hundred bronze medals."

The other side of the medal displayed the Stagecoach Inn, a Conejo Valley landmark since 1876.

The club presented one set of medals to George F. Douglas, Corporate vice president and Ventura general manager.

Another set was presented to the Thousand Oaks Historical Society, for display in the Stagecoach Inn Museum when it is opened.

News Wires Report F-5 Selected For Netherlands Defense

The news wire services reported as the Northrop News went to press that the Netherlands Ministry of Defense has selected the Northrop F-5 Tactical fighter to replace older combat aircraft in the Royal Netherlands Air Force.

An official communique issued at The Hague following a meeting of the defense ministers of Holland and Belgium was the source of the announcement. A decision regarding the Belgian selection of a new fighter was promised not later than February 15, 1967.

Ventura Employees Viewpoint Machinist Trainees on Opportunities

Five Northrop Ventura men have participated in the third tour of Ventura facilities by a group of federally sponsored machinist trainees.

The 28 trainees are studying at Ventura High School under terms of the Management Development Training Act.

Personnel representative Johnnie Via conducted the tour and addressed the men on "Betterment of Opportunities Through Education."

Mr. Via also showed them the Ventura-produced movie, "The Last Five Miles Home," which describes the Apollo Earth Landing System.

The trainees and their instructor, Al Robinson, were shown through the machine shop by Jack Christian, machine shop supervisor.

Ted Szostek, Paralab foreman, conducted them through the para-

chute fabrication facilities.

Andy Andrews, Manufacturing supervisor, discussed the RP-76 drone assembly line, and the area where the T-38 ejection seats are made.

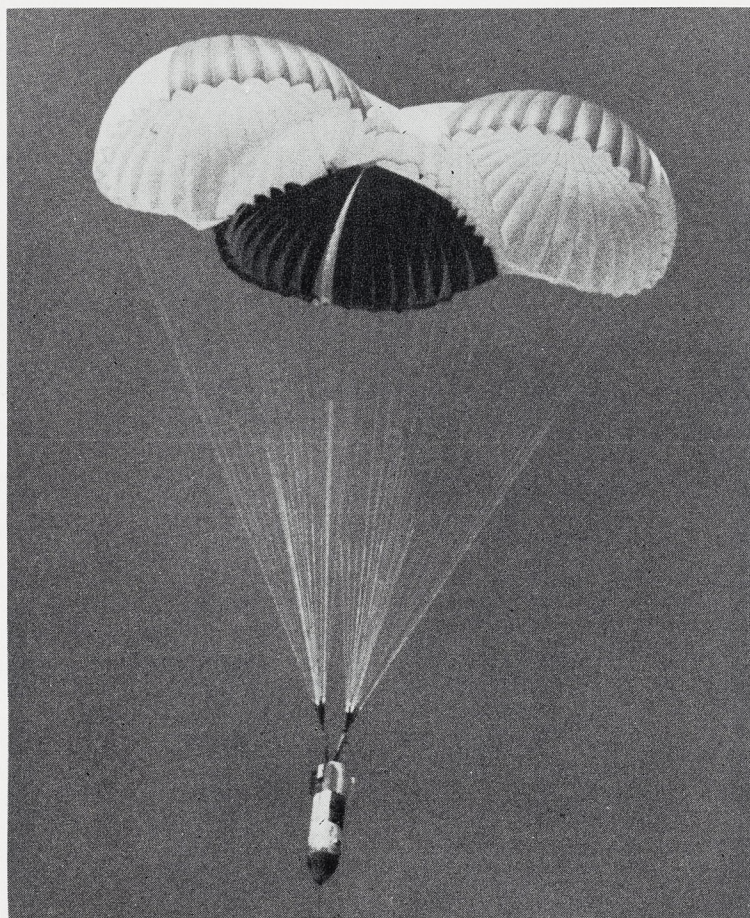
Harry McLaughlin, Plastic Products foreman, explained functions of the Plastics area.

Show Drone Target

Via showed the men the NV-105, Ventura's turbojet-powered drone target. He said the men received "an intensively documented tour" of the Machine Shop, since they are being trained in machine operation.

Soon, Via said, two groups from California Lutheran College in Thousand Oaks will tour the facilities. One will visit the Northrop Data Processing Center at Ventura; the other, composed of business students, will tour Finance, Cost Accounting, Audit and related areas.

Cloverleaf Parachute Test Paves Way For Radio Controlled Drops



A SUCCESSFUL TEST of a Northrop Ventura-built steerable parachute nears its end as the parachute descends toward the desert near El Centro. The three-lobed parachute was dropped with a 5000-pound test vehicle, setting things up for future tests which will involve the steering vehicle.

(Photo by Gil Nunn)

A highly successful test of Northrop Ventura's Cloverleaf parachute has helped to clear the way for tests in which the gliding chute will be steered from the ground by radio controls.

The 56-foot diameter parachute is the largest Cloverleaf yet tested. Smaller models have demonstrated the ability to glide up to nearly two feet horizontally for each foot of vertical descent.

The drop test, conducted this month with a 5000-pound test vehicle at Ventura's El Centro facility, did not involve the parachute's steering vehicle.

Project Manager Carl Graham, who observed the test, said the Cloverleaf was dropped from a B-66 at an altitude of 6000 feet at a speed of 150 knots.

Right On Target

"It floated down right to us," Mr. Graham said. "All we had to do after it landed was walk right out and take a look at it."

The Cloverleaf was deployed by a drogue parachute, which in turn was activated by a static line, attached to the airplane.

From release to landing, the parachute was in the air for 138 seconds, descending at a final rate of 25 feet per second.

(See TEST, page 6)

Junior Achievement Is A Family Affair For The Finches

Junior Achievement is a family program at the home of Doug Finch of Northrop Ventura.

Mr. Finch of Graphic Arts is in his sixth year as advisor to the Ventura-sponsored Junior Achievement program. And his son, Mike, a junior at Thousand Oaks High School, has been elected president of the program for 1966-67.

The younger Finch was active in the program last year as per-

sonnel director. He was elected by a vote of the 20 members of this year's Junior Achievement company.

At the same time, the students elected Stephanie Allan vice president of sales, Jim Johnson vice president of manufacturing, Toni McArthur secretary, and Donna McArthur treasurer.

The company, which will sell automotive tie-down straps and

(See MINIKO, page 6)

TAKE TIME OUT! TIME CHANGE AHEAD

It's time out to change the time again.

At 1 a.m. Sunday morning, October 30, all California clocks will be turned back one hour from Pacific Daylight Saving Time to Pacific Standard Time.

All Northrop facilities will set clocks back one full hour on all regular work schedules beginning Sunday.

Don't forget to change all clocks at home accordingly. It's time for a change in time.

Demonstrating Plastic Forming



LEARNING BY OBSERVATION—Seven plastics trainees at Northrop Ventura watch as Zelda Hampton (seated) demonstrates various fiberglass forming operations. At left, Paul Stewart, training supervisor. The trainees are (from

left) Frank Koontz, Tony Mata, Elma Arroya, Mary Jenkins, Glen De Lorenzo, Arthur Lara and Betty Donnell. The trainees completed their intensive 120-hour instruction period this week.

Out of California's Past:

The Hunts Help Restore Glories Of Fabled Stagecoach Inn

Most of the residents of the fast-growing Conejo Valley are looking to the future as they move into the new homes which are beginning to line the tree-dotted hills.

But several long-time Conejo citizens, including Mr. and Mrs. Orville Hunt, are making sure that the area's fascinating past will not be neglected in that future.

The Hunts were among the first to contribute recently to the restoration and rebuilding of the Stagecoach Inn, which was built in Thousand Oaks in 1876 and served as a stage line depot until 1901.

Founder's Secretary

Mr. Hunt, Northrop Norair director of Banking and Credit, and his wife, Patricia, who was Jack Northrop's secretary at the time of Mr. Northrop's retirement, have lived in Thousand Oaks for several years.

Their contribution to the restoration of the two-story landmark was made in the memory of Mr. Hunt's mother, Martha Lowsley Hunt, who spent much of her life in the Conejo area.

In 1884, at the age of 9, Martha Lowsley and her family moved to Santa Barbara from Lynchburg, Virginia. In 1902, she married Walter LeRoy Hunt, a Santa Barbara mercantile businessman. A few years later, Orville Hunt was born.

"I first remember the Stagecoach Inn as it looked around 1911 or so," Mr. Hunt said.

"We kids (there were four brothers) would take the train to Camarillo from Santa Barbara, and grandfather would pick us up in a buggy and take us to his ranch."

Grandfather was Richard Orville Hunt, owner of Salto Ranch, in the heart of the Conejo Valley. Salto Ranch



HISTORY TAKES A TOLL—Orville Hunt (left) with Dr. Michael Hagopian, president, Conejo Valley Historical Society, evaluate damage to windows of Stagecoach Inn as they contemplate the many needed repairs which will be made to establish the Inn as a museum to help bring back some of its past glories.

later became known as Hunt Ranch. Most of the property today is known as Lynn Ranch.

She Sets Precedents

Martha Lowsley Hunt established some "firsts" in her early days in California.

She became the first woman employee in Santa Barbara County history, at the age of 14. After her marriage, she became the county's first licensed woman driver; and only the third woman driver in the state.

Her husband died in 1923, and Mrs. Hunt continued to operate his business, Hunt Mercantile Company, until 1932.

In that year, she moved to the ranch to stay, living there until 1962, when she died at 87.

Even the loss of the original ranch house to a 1946 fire didn't keep her away. Because of the recently ended war, there was a shortage of building materials, so Mrs. Hunt purchased

two surplus buildings from the U.S. Army; then moved them onto the property.

Also contributing to the restoration of the Stagecoach Inn have been Oswald A. Hunt, Orville Hunt's brother; and Mr. and Mrs. Robert W. Hunt, jr., son and daughter-in-law of the late Robert W. Hunt.

The Hunts made their gifts in a ceremony conducted by the Conejo Valley Historical Society, a nonprofit group organized two years ago. It has more than 250 members.

At the ceremony, the inn was opened to the public for the first time since it was moved about 200 yards from its original location. It was moved last year because of road construction through the original site.

"There's a lot of work ahead," Mr. Hunt said. "The inn was closed up for a long time, and most of the windows are broken, and the floors are warped."

Interested in Europe Tour? Attend NRC Nov. 2 Meeting

Hawthorne area personnel interested in an NRC-sponsored European tour next year (May 18 to June 7) are invited to attend an organizational meeting set for 7:30 p.m., November 2 at NRC Clubhouse, Hawthorne.

Tour officials will show mov-

ies, answer questions and accept reservations.

Options available include roundtrip air fare (\$325) only or one of two continental tours, Southern Europe (\$350) or Scandinavia (\$375). A \$100 deposit is required for each reservation. Personnel Activities offices have tour information.



A SYMPOSIUM ON TITANIUM provided the material for a report issued by the Defense Metals Information Center. The symposium, held by Northrop Norair in March, brought together several experts on titanium and its uses. Dr. E. B. Mikus (left), chief of Norair Materials Research, and Bret Calfin (center), Materials Research engineer, review copies of the report with E. W. Cawthorne of the DMIC. Dr. Mikus chaired the titanium symposium.

Wolfe Named Editor Of The Northrop News

Stewart J. Wolfe has been appointed editor of the Northrop News it was announced by Norman Warren, corporate director of Public Relations and Advertising.

He succeeds Charles Ramsey who assumes new duties with the Public Relations department in Beverly Hills.

Wolfe has had long experience in both public relations, merchandising and company publications. He comes to Northrop from the Jam Handy Organization in Detroit where he was editor of *Communication Central*, dealer management publication for the Chevrolet Division of General Motors.

Other experience includes sales training, merchandising and employee communications with Ford Motor Co., American Motors Corp. and Parke, Davis & Co.

He is a former president of the International Council of Industrial Editors and an electrical engineering graduate of Purdue University.

Company Helping Train Air Force Officers In Management Techniques



A DAY IN THE LIFE OF—Judy Lockwood, Product Support secretary at Norair, draws chuckles as she outlines daily schedule for four Air Force officers taking part in Education With Industry program at Northrop. They are, from left, Captains Daniel G. McIntosh and Joseph A. Pucci, First Lieutenant James B. McCabe, and Captain Conrad J. Luecke. Officers will work through Northrop divisions and facilities during their 10-month stay at Northrop.

A comprehensive 10-month training program stressing industrial planning and procurement executive development is now under way within Northrop for four Air Force career officers.

They are Captains Conrad J. Luecke, Daniel G. McIntosh and Joseph A. Pucci and First Lieutenant John B. McCabe.

The officers are participating in the Education With Industry Program sponsored by the Air Force Institute of Technology and conducted by Northrop and other participating firms.

To Develop Understanding

Basic objectives of the training are to increase individual competence in the understanding of aerospace management principles, policies, planning, procedures, problems and problem-solving techniques.

This will be accomplished by allowing the officers to work for varying periods of time in many functions and organizations, taking part in activities and assuming some responsibilities.

Toward this end the officers will work throughout Northrop facilities, at the Corporate office and go out to visit field offices and distant operating facilities.

Each Northrop division will participate in a part of the program.

Captain Luecke is a graduate of Albion College (BS in chemistry) who entered the Air Force in 1954. He has served as a crew commander on KC-97 and KC-135 aircraft.

His last duty assignment was as a KC-135 simulator instructor.

Second Assignment

Captain McIntosh is returning to Northrop for his second duty assignment. From 1958 until 1961 he was a member of the AFPR staff as an auditor. He has held other auditor posts since graduating from Officer Candidate School in 1956. He is a graduate of California Western University (BA accounting) and a former Air Force enlisted man.

Captain Pucci was also an Air Force auditor, serving at Patrick and Goose Air Force Bases and the Air Force Academy. He entered the Air Force in 1961 following his graduation (BA business administration) from the University of Minnesota.

Lieutenant McCabe holds a degree in Marketing from Oklahoma State University and entered the Air Force in 1964. He was a construction contract administrator and deputy chief—Procurement Division at Selfridge Air Force Base, Michigan, prior to being accepted for the Air Force Education With Industry program.

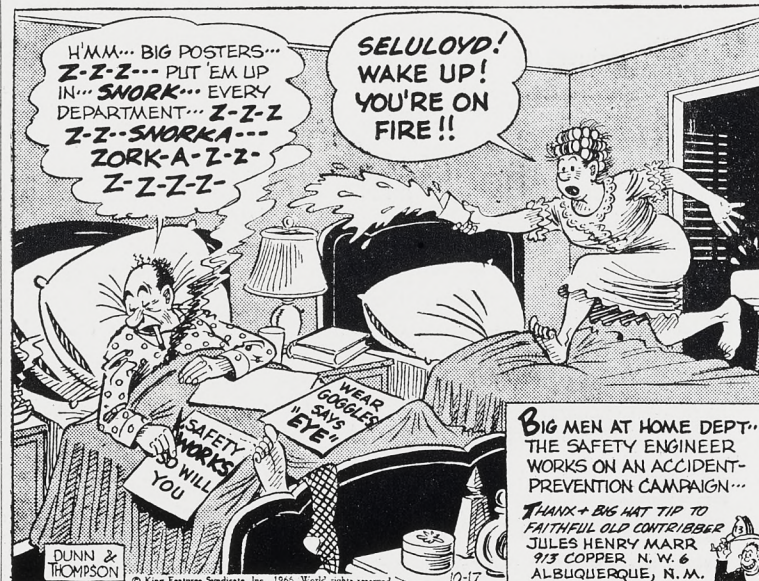
Glenn Lord Honored by NSIA

Glenn R. Lord, Northrop Corporation vice president-Marketing, has been named to serve on the Executive Committee of the Los Angeles Chapter of the National Security Industrial Association.

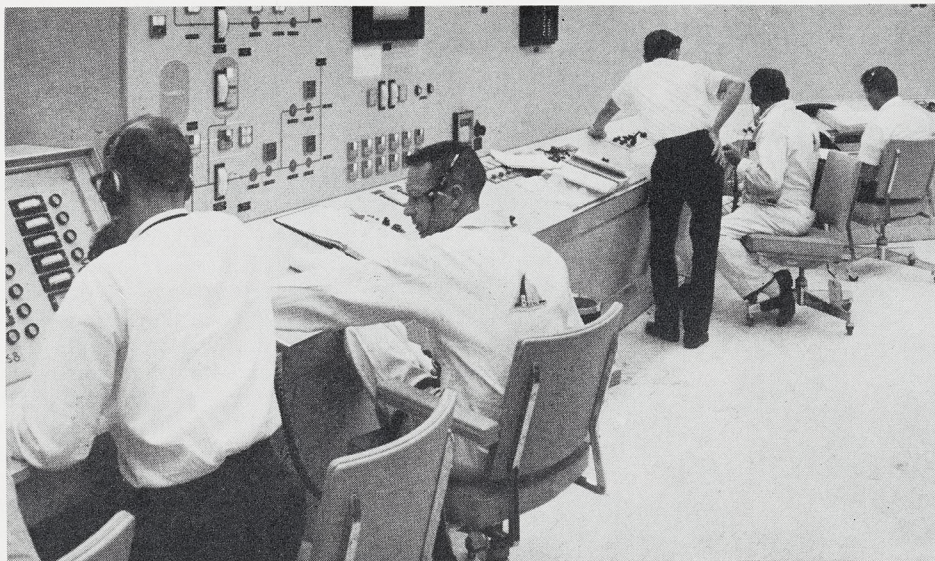
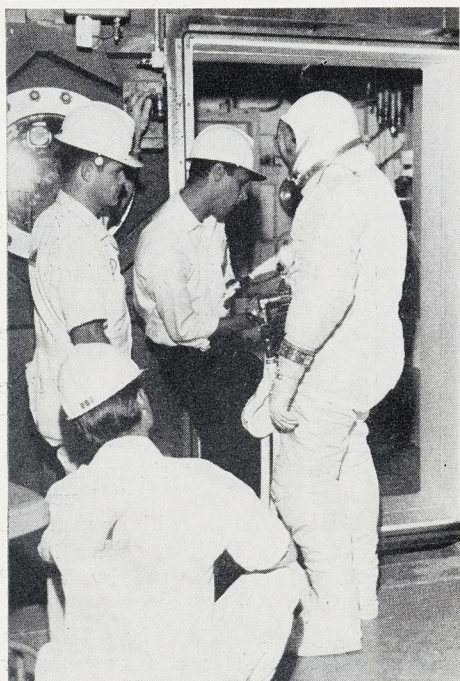
His term of service began this month and will continue until next October.

THEY'LL DO IT EVERY TIME

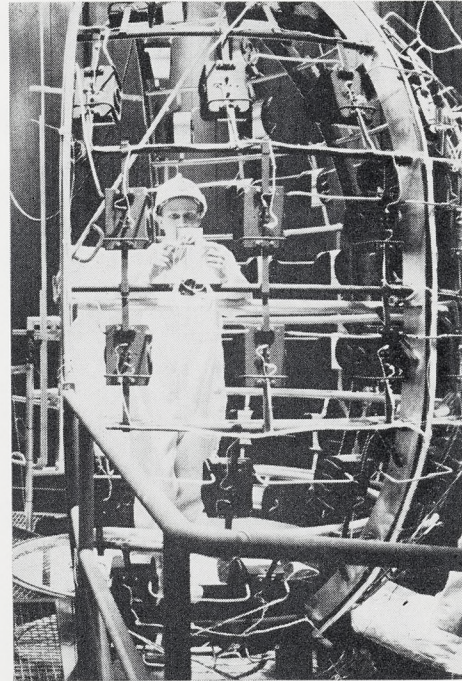
By Jimmy Hatlo



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LAMAR CALDWELL, BRN vacuum technician (above), along with other BRN employees, operate control panel for space chamber at NASA's Manned Spacecraft Center, Houston, where BRN has support contract. At right, Clarence Blume, an electronic technician in the Experimental Mechanics Laboratory, adjusts microphone inside space chamber. At left, other BRN'ers check space suit controls prior to test subject's entry into test chamber.



LUNAR SIMULATORS

How High the Moon? Take a Tour of BRN

The moon is no closer to Houston than it is to the rest of the earth, but you'd think it was, after a tour of NASA's Manned Spacecraft Center.

From its outdoor simulated lunar surface, to its Crew Systems Laboratory, where space clothing and survival gear are tested, the MSC is clearly moon-oriented.

Helping to operate these facilities, and others at the Center, is Brown & Root-Northrop (BRN), a joint venture of Brown & Root Inc. of Houston and Northrop Corporation.

BRN holds the Operation and Maintenance Support Services (OMSS) contract for the Center. The two corporations formed BRN in 1964, and entered the operations contract with NASA in December of that year.

As might be presumed in a joint venture, BRN is composed of Northrop personnel, Brown & Root employees, and those who were hired after the venture began. They officially are BRN employees. In addition, a separate subsidiary (Darius Field Facilities) fulfills the maintenance portions of the contract.

BRN policies are governed by an executive board, similar to a board of directors, composed of three officers from Northrop Corporation and three from Brown & Root Inc.

BRN has nearly 650 employees.

Northrop is represented at BRN by 10 Northrop Space Laboratories men, headed by Harry P. Clagett, deputy project manager. The BRN project manager is Harry Hutchens of Brown & Root.

Other NSL personnel at Brown & Root-Northrop are, listed alphabetically:

Frank Holt, assistant technical supervisor, Space Environmental Simulation Laboratory (ESL); Don Knittle, assistant technical supervisor, Experimental Mechanics Laboratory (EML).

W. B. Kurz, supervisor, Personnel and Industrial Relations; Charles Martin, senior engineer, Crew Systems Laboratory (CSL); Carlos Montero, assistant technical supervisor, CSL.

Tom Overton, senior quality engineer, Quality

Control; Bruce Vernier, technical supervisor, EML; Edward Zick, Contracts supervisor; and Bill Zimmerman, supervisor of Accounting and Finance.

BRN with assistance from appropriate NASA personnel, operates and maintains the Crew Systems Laboratory, the Experimental Mechanics Laboratory, the Space Environmental Simulation Laboratory and the Thermochemical Test Area.

The CSL is part of the MSC Crew Systems Division and operates equipment used in testing and evaluating life support systems utilized in manned space flight programs. CSL also prepares and maintains test facilities and equipment used in defining flight equipment tolerance to the acceleration experienced in space flights.

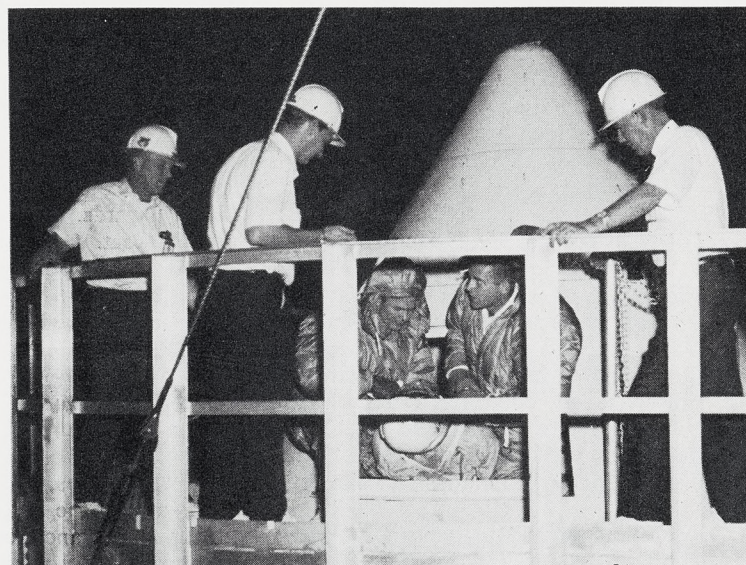
The EML supports and is a part of the Center's Structures and Mechanics Division in the mechanical evaluation and qualification of spacecraft assemblies, components, test specimens and support equipment, utilizing dynamic and static testing methods. The EML also provides engineering and technical assistance in test preparation, operation and disassembly, including the gathering and presentation of data.

The ESL tests, analyzes and evaluates spacecraft, spacecraft systems and subsystems, and components and test articles under simulated space environment conditions.

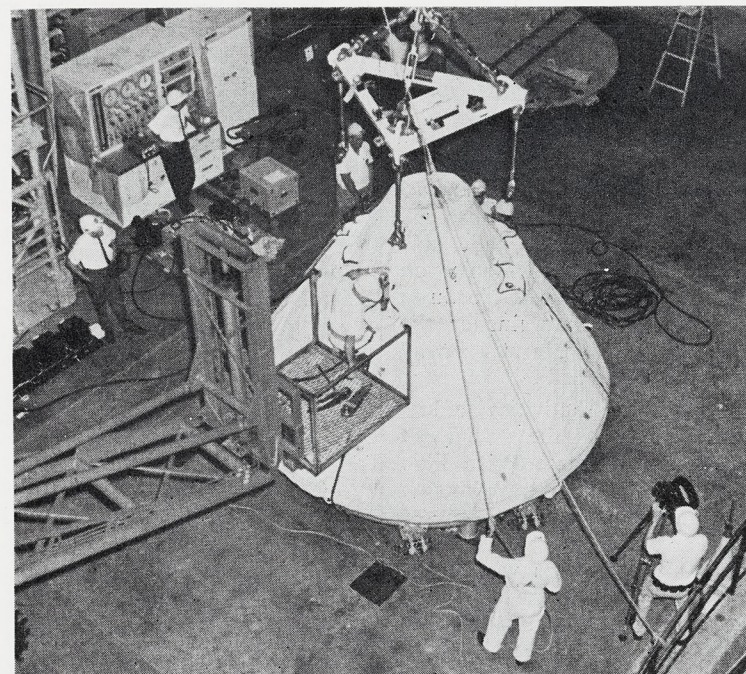
The ESL operates and maintains the space simulation chambers and other equipment required to simulate space conditions. The group also provides engineering and technical assistance in test documentation preparation, test planning, installation of test equipment, instrumentation, data gathering and presentation, and the presentation of reports.

The free world's largest vacuum chamber is in the ESL area. The chamber, 120 feet high and 65 feet in diameter, simulates a vacuum at 500,000 feet. It also recreates the thermal and solar radiation conditions encountered in space flights and on the lunar surface.

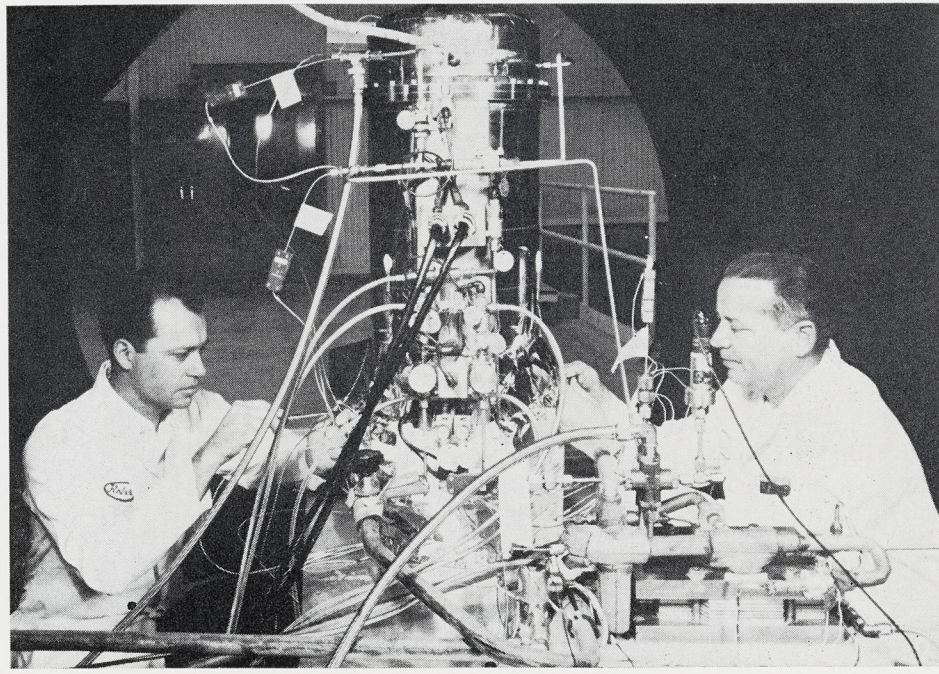
The Thermochemical Test Area personnel (See HOUSTON, page 5)



APOLLO COMMAND MODULE (below) is prepared by Brown Root-Northrop employees for installation in chamber 'A' of Space Environmental Simulation Laboratory (ESL). Within the ESL (above) a rescue drill is conducted using techniques developed for three-man spacecraft which will make the U.S.'s first manned trip to the moon.



WORKING IN NASA MICROBIOLOGY laboratory, Rosemary Van Norden (left) and Theran O'Bryant of BRN Biomedical Support section prepare sterile material for test. Nearby, in Thermochemical Test Area Systems (TTA) laboratory (photo at right), BRN technicians give fuel cell once over thoroughly.



TTA personnel participate in development, evaluation and qualification testing of propulsion, pyrotechnic and electrical power systems and subsystems.

Air Force Captain Praises Company's F-5 Life Saving Ejection Device

"All of my equipment worked exactly as advertised."

There are at least two votes cast in favor of this as the world's "sweetest phrase."

One is cast by Captain Jay Paulsen, USAF, who issued it. To him it was a possible life and death proposition. It summed up his experiences in ejecting from a Northrop-built F-5 after being hit by enemy fire in Vietnam and his subsequent rescue.

The other vote is from thousands of Northrop employees and others who contribute to making the F-5 the type of aircraft such a phrase can be attributed to.

Captain Paulsen recently returned from Vietnam to attend an F-5 Flight Manual Command Review Conference at Norair.

With a minimum of superlatives, Captain Paulsen described his experiences which began while he was in a shallow dive on a target in Vietnam and felt a "WHOOOMP" and immediately lost power in both of his F-5 engines.

Plane Hit, Power Fails

His report went something like this:

"I don't know what hit me, but the power failed completely. I dropped the stores (armament) and headed toward the water. I pulled into a powerless climb and ejected."

"Everything seemed to happen slowly, although a ground observer said it was over quickly."

"I watched the canopy rise and leave the aircraft. The ejection seat began moving. There was no shock, it seemed to accelerate



"EVERYTHING WAS OVER QUICKLY"—Captain Jay Paulsen, USAF (with model), explains how F-5 ejection system worked perfectly for him following direct hit by enemy fire in Vietnam. Listening, from left, are Gaylord Anderson, Norair director of Field Service and Training, Colonel Philip Hallan, USAF, and Major Wayne Jenkins, USAF. Visitors were on hand for F-5 Flight Manual Command Review Conference at Norair.

slowly. I went straight up until clear of the aircraft, then back until I was face upwards. I was separated from the seat. I heard a WHOOSH and the parachute played out of the bag, then blossomed. There was no shock. I hit the water, got free of the chute and climbed into my raft."

Needed Proper Hoist

Captain Paulsen described how a "Huey" helicopter was above him in a very few minutes, but had to pull away due to the lack of a proper hoist. Then another helicopter appeared, dropped a hoist and pulled him aboard.

"Within 15 minutes of the time I hit the water I was on my way back to the base," Captain Paulsen said.

Captain Paulsen's final statements also indicate his interest in flying the F-5 in Vietnam.

"My home is in Long Beach, so I'm glad to be able to attend this conference. However, I'm anxious to go back," he said. "All the fighter pilots over there want to get into the F-5 and I might not have a job, if I stay away too long."

"The F-5 has a record of receiving less hits from ground fire than any other jet aircraft involved in air-to-ground operations. Further, when we meet on our terms, we can 'wax' any other fighter in the area. We feel the MIGs are avoiding us," he concluded.

Top Fighter Pilots Attend F-5 Meeting

Experience was readily apparent early this month when an F-5 Flight Manual Review Conference was staged at Northrop Norair.

This conference hosted by Product Support and attended by representatives of organizations flying and supporting the F-5 around the world, was held to review operational requirements and recommend changes to the pilot's flight operating instructions for the F-5 family of aircraft.

Attending were some of the world's finest fighter pilots, including one past and one present member of the 10th Fighter Commando Squadron, USAF, flying the F-5 in Vietnam.

The former member was Lieutenant Colonel Alfred Hopkins who now commands the 4441st Combat Crew Training Squadron at Williams Air Force Base, Arizona, the group which trains F-5 pilots.

Flies Against Viet Cong

In from Vietnam for the conference was Captain Jay Paulsen who flies against the Viet Cong as a present member of the 10th FCS.

And the four Norair men from Product Support assigned to write the F-5 Flight Manual, also in attendance, have an aggregate of 86 years of military flying to their credit, including 23,600 aircraft flying hours and 401 combat missions. They are Bob Leudeka, Bill Carter, Gene Derrickson and Hank Cervantes, who have the responsibility of preparing all of the Flight Handbooks for Product Support's Publication group.

Ed Dock of the Air Force's Aeronautical Systems Division, AFSC, was conference chairman.

VNAF Vets Arrive At Williams AFB For F-5 Training

Veterans of Vietnam's long fight for freedom have arrived at Williams Air Force Base, Arizona, for flight training in Northrop-built F-5 fighters.

They are 33 Vietnam Air Force (VNAF) officers who have logged many hours of combat time against the Viet Cong flying propeller-driven Skyraiders.

Over the next six months the pilots will learn techniques of aerial combat with supersonic F-5's, the first jet fighter to be programmed for use by VNAF squadrons.

Nguyen Coa Ky, Vietnam prime minister and commander of the VNAF, recently announced for the first time plans for equipping VNAF units with the Northrop F-5. (Northrop News, September 28).

Conclusion of the current training program, scheduled for next April, is expected to coincide with the delivery of the first squadron of F-5's for VNAF use.

More to Arrive Later

This is actually the first contingent of VNAF trainees expected of Williams AFB. Later this year airmen and noncommissioned officers from the VNAF will arrive to enter a detailed maintenance and ground crew training effort.

While at Williams AFB the VNAF elements will be assigned to the 4441st Combat Crew Training Squadron.

A majority of the officer-instructors in this organization are veterans of Vietnam combat flights during the United States Air Force "Skoshi Tiger" evaluation of the F-5. Lieutenant Colonel Alfred Hopkins, 4441st CCTS commander, is a veteran of this effort as well as a former commander of the 10th Fighter Commando Squadron which is now flying the F-5 in Vietnam in an operational environment.

The VNAF pilots are slated for a minimum of 55 hours of flying time at Williams AFB. This will include everything from jet

(See VNAF, page 5)

Want To Save Money On A Shiny New '67? Here's A Special!

Has one of the new 1967 automobiles caught your fancy?

If so, Northrop Personnel Activities offices may be able to help you save money on your purchase. And Northrop Credit Union can finance the deal for you, again at a saving over most methods.

Personnel Activities offices have copies of the new Fleet Discount Purchase Price Plan catalogues, listing each model, its basic cost and the cost of accessories. There are also listings of dealerships where you may buy under the fleet discount plan.

Here's how it works: consult the catalogues and decide on the make and model you like; select the dealer; pick up an introductory card to the dealer; visit the dealer and complete your purchase; then call on Northrop Credit Union for the best loan terms available.

Bridge Club Fans To Form Club Nov. 4

Numerous requests have been received by NRC to reactivate the NRC Bridge Club in the Hawthorne area.

(Nortronics Anaheim has an active Bridge Club).

An organization meeting for this purpose has been set for 7:30 p.m. November 4 at NRC Clubhouse, Hawthorne. Acting commissioners will be appointed and plans mapped for future events.

Other information is available through Don Kohler, ext. 2486, at Norair.

Roy Jackson to Guide Stanford Fund Appeal

Roy P. Jackson, Northrop Norair vice president and assistant general manager, has been named regional chairman of the Annual Fund for the Stanford University School of Engineering.

Mr. Jackson graduated with distinction from Stanford in 1941 and now serves as a member of the executive board of the Stanford Alumni Association.

The Engineering School drive is part of the Stanford Annual Fund started 30 years ago to support the University which depends upon private gifts and endowment income for a significant share of its operating funds.

Annual All Northrop Holiday Dance Plans Announced by NRC

Northrop Recreation Clubs have selected November 26 for the annual all-Northrop Holiday Dance this year.

The famed International Hotel is the site.

Entertainment, and dance music, will be provided by Alvino Ray and his Orchestra, the Latinaires, the Guideposts and a special intermission combo.

Three ballrooms have been reserved just for Northrop folk, the International Room, the Rose Room and the Blue Room.

Tickets, now available at all outlets, sell for \$2 per person. Parking will be \$1 or 50 cents with validations.

Appoint Llewellyn F. Stanton To AIA Western Asst. Mgr. Post

The Aerospace Industries Association has appointed Llewellyn F. Stanton, 25-year veteran of the aerospace industry, assistant manager of its western office in Los Angeles, Karl G. Harr, jr., AIA president, announced.

In this position, Stanton will assist Ken Ellington, who since May 1965 has headed AIA's western office. He will be responsible for coordinating the work of the various AIA committees meeting on the west coast.

Stanton comes to AIA after 25 years with the Northrop Corporation where he was involved in budget administration, accounting

systems, long range facilities planning, contract administration and since 1964 has been suggestion awards analyst.

He is a mechanical engineering graduate of Johns Hopkins University and spent one year at the Harvard Graduate School of Business Administration.

One hundred percent of the employees of the White House in Washington now are buying Savings Bonds on the Payroll Savings Plan. Many other governmental units, both civilian and military, have exceeded the 90 percent mark.

Brothers Celebrate 25 Yr. Award



SHARING THE HONORS—Norair's Carlisle brothers, C. B. (Parks) and Shelley, help one another pin on Northrop's 25-year pins. Brothers were first to join Northrop on same day, although other brothers among employees have received 25-year pins previously.

Here's When To File For Medicare Benefits

Persons who are nearing 65 have been reminded that they may file for Medicare benefits up to three months before their 65th birthday.

The reminder was issued by the Social Security Administration's office in Inglewood.

A person may continue to work full time and still be eligible for Medicare payments, the news release said, as earnings do not affect eligibility.

Further information may be obtained by calling Field Representative Kenneth B. Judy at 673-5222.

STEAK FRY DEADLINE

Friday is the deadline for procuring tickets to the Northrop Wanderers steak fry and campout November 5-6 at Nojoqui Falls Park.

Camping fees are \$1 per unit. Steaks will sell for \$1.50 for adults, \$1 for children. This includes all the trimmings. Families will each bring one pie for dessert.

Steak fry tickets may be obtained from Personnel Activities.

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

For Sale

Exec. Home, 4-bdrm. inc. lge. master bdrm., 1 1/2 baths, nearly 2100 sq. ft., 2-car gar., lge. fireplace, elec. kitchen w/bltins, cpts., dps., within walking dist. of Northrop, 6 1/2% take over loan avail., \$34,950. Hawthorne, PL 6-9659. A

Pups, miniature Dachshund, AKC champ. stock, 2 black males, 1 red female, males, \$60; female, \$70. Torrance, DA 5-7806. A

Accordion, Scandalli, 120-bass, w/case, \$100. Box 2101. A

Lense, Nikor, 28mm for Nikon F camera, never used, cost \$179, \$90. Box 2102. A

Cub Scout Uniform, size 8, complete, worn twice, \$6. Torrance, FR 9-5690. A

G/P Sprite, 1962, w/1965 eng., many extra parts, \$750. Port. Bend, 377-2921. A

Land, 1 1/4 acre parcels, improved, lake view, Lake Isabella, \$2800. Gardena, 635-3127. A

Interior, complete, for 1964 Chev. Super Sport, incl. b/seats, rear seat w/speaker, arm rests, side panels, cpts. & console, fits any 2-dr. Chevy from 1959 thru 1964, sedan or h/top, \$100. Redondo Bch., FR 8-2055. A

Thunderbird, 1964, all power, 1-owner, \$2250. Camarillo, 805-482-6740. A

Volkswagen 1300, 1965, factory air cond., radio, seatbelts, \$1550. Simi, 526-8927. A

Shop Manual, 1955 Dodge Dart & Coronet, \$2. Inglewood, 671-0109. A

Honda, 1966, 160cc Scrambler, 2500 miles, \$425. P.V. Pen., FR 7-5853. A

Movie Camera, 8mm Keystone, 3 lens turret & projector, \$50. Inglewood, 759-8920. A

Cadillac, 1956, Coupe De Ville, \$395. Rolling Hills, FR 7-3487. A

Ford, 1959, 4-dr. station wagon, 6-pass., V-8, r/h, Fordomatic, orig. owner, low mileage, \$475. Gardena, 676-0432. A

Surfboard, Roberts, 9'3", \$55. Westchester, 670-4702. A

Porsche, 1963 coupe, AM-FM Becker, chrome wheels, orig. owner, \$2650. La Habra, 691-4986. A

Plymouth, 1957 4-dr., stick, new battery, \$125. Brea, 670-2762. A

Rambler, 1960, Classic, 4-dr., r/h, \$425. L.A., 272-2659. A

Piano, maple spinet, \$400. Los Alamitos, 431-4010. A

Honda, sports model S-90, 1-yr.-old, 3000 miles, luggage rack, dual mirrors & helmet, \$325. San Pedro, TE 3-4272. A

House, 5-bdms., extra lge. liv. rm. & den, 2 1/2 baths, 2 fireplaces incl. 1 w/full wall P.V. stone, 2700 sq. ft., cpts., dps., elec. kitchen, \$39,950. La Habra, 691-5166. A

Drapes, 29 yds., traverse, hand-blocked, lined cost \$300, \$50. Long Bch., GA 2-5074. A

Dining Room Set, old-fashioned buffet & lge. table w/6 chairs, \$125. Inglewood, 674-1796. A

Acreage, 5 acres near Rosamond, \$975 dn. & take over pymts. at 6% interest, \$2975. Torrance, FR 8-1026. A

Band Saw, 12" Craftsman, w/1/2 h.p. motor & stand, cost \$150; \$85. Huntington Bch., 714-962-3597. A

BSA, 1965, 175cc, 1900 miles, \$325. Inglewood, OR 2-7628. A

Bedroom Suite, dble. bed, box springs & mattress, mirrored chest, comb. chest & wardrobe, night stand, antique, \$75. Playa del Rey, 823-1910. A

Motorcycle, 1962, Matchless, 650cc twin, 4-spd., stock, \$550. Hawthorne, 672-1576. A

Tires, 4 retreads, 14 x 900, \$10. Wilmington, TE 4-7188. A

TV, 21" Packard Bell, \$15. Hawthorne, 675-7955. A

Bookcase, w/adjust. shelves, mahogany, dble. glass door, \$35. Westminster, 714-897-0597. A

Motorcycle Tires, 2 w/tubes, 250-16 Knobbies, \$12. Hawthorne, 679-5371. A

Refrigerator, Philco, 5 cu. ft., \$35. Manhattan Bch., 545-1662. A

Volvo PU 544, 1960, good mech. cond., needs some body work, \$250. Playa del Rey, 823-1962. A

Guitar, Kay, w/case, \$60. Hawthorne, OS 6-4272. A

Radio, Citizens Band, 5-watt transceivers, 2 units made by I.C.C., 5 crystal channels, crystals & stainless whip antenna, cost over \$350; \$150. Hollywood, HO 5-6956. A

Guitar, Kay, & case, \$35. Torrance, DA 6-8273. A

Ford V-8, 1955, r/h, smog device, auto. trans., 4-dr. sedan, \$95. Wilmington, 834-2452. A

Honda, 1965, 305 Superhawk, 2 helmets, extras, \$500. Torrance, 326-6195. A

Volkswagen, 1955 Square Back 1500S, \$1800. Anaheim, 714-828-3718. A

Auto, 1925 Star Sport Touring, completely restored, incl. spare rebuilt eng., \$1800. Lancaster, 805-942-0576. A

Coin Collection, U.S. & foreign, proof, mint, gold, \$190. Box 2103. A

Guitar, elec., bass & treble switch, \$45. Manhattan Bch., FR 4-0750. A

Bonneville, 1966, fully equipped, \$3500. Garden Grove, 530-3242. A

Camper, 8' slideon, 3 mos. old, oak paneling, table & ice box, cost \$650; \$550. Bellflower, ME 4-1761. A

Pontiac, 1959, 2-dr. h/top, \$500. Hawthorne, OS 6-7368. A

For Sale

Home, 3-bdrm., 1 1/4 bath, fam. rm., cpts., dps., dble. gar., patio, landscaped, fenced on 1/2-acre lot, 1 1/2 mile from Ventura Div., 5 1/4% existing FHA, \$18,500. Newbury Pk., 498-3791. A

Home, 2-story in Simi, 4-bdms. & den, 2 baths, cpts., dps., patios front & rear, used brick landscaping, fences, 5 1/4% G.I. resale, will assume 2nd if required, \$150 mo. lease or \$23,500. La Palma, 805-527-0212; 714-827-1958. A

Cabin Cruiser, 18 1/2', 7' beam, 3' deep, bait tank & pump, comp. & control cables, life jackets, C. G. requirements, 50 h.p. Johnson elec. start., sleeps 3, trailer, \$1700. Torrance, DA 7-2831. A

El Camino, 1964, auto. trans., \$1500. L.A., OL 1-2244. A

Furnace, 105,000 btu GE forced-air, 2-spd., gas, 6 mos. old, under warranty, \$125. Diamond Bar, 595-5877. A

Austin Healey, 1960, Sprite, r/h, new battery, paint, good tires, \$600. Rolling Hills Ests., 377-0114. A

House, in Torrance, 3-bdrm., 2 baths, near shopping & schools, 5 1/4% mortgage, \$141 mo. or \$26,950. P.V., 377-9666. A

Golf Clubs, 4 woods, 1, 3, 4, 5, D2, reg. shaft, Northwestern, \$25. Anaheim, 535-3711. A

Jeep, 1952, wag., 4 wd + od, r/h, sand tires, incl. 2 new spare tires, \$800. Anaheim, TA 8-1511. A

Camper, 1966 Grishman, w/refrig., 2 beds, table, lots of storage & closet space, 54" high, used once, \$425. Lawndale, OS 9-8525. A

Chevrolet, 1960 Bel-Aire, 4-dr. sedan, r/h, V-8 auto., \$375. W.L.A., 477-2342. A

Encyclopedia, Standard, washable binding, cost over \$300; \$150. El Segundo, 322-7269. A

Buick, 1961, Le Sabre station wagon, needs body work, \$535. Lawndale, 371-3919. A

Mobile Home, Universal 1957 8' x 40' w/awning, near Northrop, \$1800. Hawthorne, 754-7289. A

Rifle, chambered to 300 Savage w/powerful Mauser type action, custom-stock, Williams peep sight, & swivel, \$55. Buena Pk., 213-UN 3-2769. A

Bicycle, Schwinn, 8-spd. racer, generator light & carrying rack, \$35. Huntington Bch., 714-842-6720. A

Camper, 1966 VW Sundial, all extras, \$2500. Hawthorne, 631-0615. A

House, 3-bdrm., located 2 blocks from Compton Jr. College, detached dble. gar., fenced backyard, \$18,500. Compton, NE 8-5610. A

Dodge, 1951, 4-dr. sedan, low mileage, 1-owner, new paint, \$125. Inglewood, PL 5-8158. A

Bed, dble., walnut, w/frame and half canopy, takes a standard dble. mattress & box springs, \$25. Sherman Oaks, ST 8-9709. A

MGB, 1966, h/top & soft top, wood Nardi steering wheel, wide wheels, r/h, orig. cost \$3300, w/out h/top & wood wheels, \$2395. Box 2104. A

Archery Bow, 35 lb., w/cover & quiver, \$20. Hawthorne, OS 6-3886. A

Stereo Hi-Fi Components, AM-FM tuner, dual amplifiers, dual preamps, dual cross-overs, 4 speakers, turntable, \$68. Hawthorne, 676-0418. A

Go-Cart Frame, all steel, welded construction, yellow, \$10. Torrance, 326-4898. A

Bicycle, boy's 24", American made, \$15. Torrance, FA 8-3306. A

Sewing Machine, portable w/attachments, \$15. Manhattan Bch., FR 4-4780. A

Bicycle, Royce Union, 10-spd. Derailleur, Italian-made, \$20. Lawndale, 679-2642. A

T-Bird, 1963, air cond., all power, take over pymts., \$1700. Orange, 714-532-1361. A

Pin Ball Machine, elec., fully auto., full size, has 7 balls, 2 flippers, spec. on & off switch, \$60. Torrance, 375-6467. A

Decorator Grapes, 24 - 2" bunch, color of your choice or 2-toned, \$15. Torrance, 371-1096. A

Chevrolet, 1958, 348 cu. in. eng. 409 r/c, clutch, Muncie 4-spd., Hurst 4.56 posi., hv. duty springs & shocks, stereo & tapes, p/s, p/b, radio, many other extras, \$1550. Inglewood, 677-1495. A

Pontiac, 1964 Tempest cpe., 327 V-8, 4 bbl. p/s, r/h, auto., new b & m Hydro, 28,000 mi, orig. owner, \$1250. Torrance, 325-9352. A

Pontiac, 1963 Tempest, 4-dr. sta. wagon, 4-cyl. stick, p/s, r/h, \$950. Downey, 861-4940. A

Plymouth, 1960, station wagon, \$650. Redondo Bch., 374-1124. A

Ham Station, Swan 120 SSB transceiver, Heath supply, speaker, field strength meter, turner SR 90 D mike, \$175. San Pedro, 833-9696. A

Typewriter, Underwood Touchmaster II, office type, \$125. Redondo Bch., 325-8340. A

House, 3-bdrm., den, 1 1/4 baths, in Hollypark, \$1750 dn., immediate occupancy, \$23,600. Torrance, 754-2286. A

Surfboard, 8'8", \$40. Torrance, 375-6071. A

House, 4-bdrm., family rm., 2 1/4 baths, 1 acre, horses O.K., near Northrop Ventura, \$35,000. Somis, 805-482-1186. A

Yawl, 30' Creger, fully equipped, sleeps 5, \$5300. Manhattan Bch., 376-4002, 670-7208. A

Avanti, 1963, 295 h.p. V-8 w/stick Hydro-matic, full power, good tires, new shocks, recently tuned, \$2975 or \$1400 & take over \$66.84 mo. pymts. Hawthorne, 644-1958. A

For Sale

Chevrolet, 1957 convt., many extras, 1-owner, \$1000. Torrance 835-5052. A

House, 2-bdrm., R-3 lot, in Inglewood, \$27,500. L.A., AX 2-9489. A

German Shepherds, 10, 6 wks. old, healthy, full-shepherd but no papers, \$10 ea. Torrance, 830-4265. A

House, 4-bdrm., 1 1/4 bath, fireplace, all elec. kitchen, dishwasher bltins, screened alum. patio, w/w cpts., fenced yd., \$26,000. Torrance, 834-2175. A

Chevrolet, 1957 Bel Aire, V-8 auto., r/h, good paint & tires, orig. owner, \$355. Fullerton, 871-1406. A

Range, O'Keefe & Merritt, gas, griddle, \$40. Gardena, 320-5720. A

Refrigerator-freezer, 14 cu. ft. Norge, 2-dr., \$65. Rolling Hills Ests., FR 5-8536. A

Dark Room Equipment, enlarger, contact printer, safe lights, trays, tanks & misc. items, \$80. Inglewood, 677-6348. A

House, 3-bdrm., den, panel. liv. rm., dps., patio, 10 min. to Northrop, near schls. & fwy., \$21,900. Gardena, DA 9-2504. A

Lamp, blue opaque glass, orig. cost \$80; \$25. Rolling Hills Ests., FR 8-2190. A

Amplifier, Gibson, piggyback, 12" speaker, \$100. Redondo Bch., 376-5019. A

Acreage, 40 acres, 30 mi. south of Lake Isabella, mountain timber, rec. or investment, 10% dn., \$300 acre. Redondo Bch., FR 4-2345, 249-0185. A

Ford, 1957, Fairlane 500, eng. just o/hauled, p/s, p/b, r/h, w/w tires, \$395. L.A., PL 4-2784. A

Pontiac, 1963 G.P., f/pwr, fac. air, very low mileage, \$1895. Hawthorne, 675-4752. A

Wanted to Buy

Steno-Type Machine, in fairly good working order & comparatively new, prefer Samsonite carrying case. Cypress, 828-5943. B

House Trailer, 8' wide, furn., must be reasonable. Torrance, 324-5422. B

Belly Board, plastic foam & fiberglass construction, in usable condition. Manhattan Bch., 545-6360. B

Sewing Machine, late model, brand name, in good condition w/attachments, reasonably priced. Harbor City, 325-4590. B

Duplicating Machine in good condition, spirit type not acceptable, must be reasonable. Lakewood, ME 3-6346. B

Bicycle, 20" boy's, any make, fair condition. San Pedro, 833-6045. B

Wall Mirror, 24x30, w/maple frame. Redondo Bch., FR 2-3827. B

Stove, apt. size, elec., Hawthorne, 676-7961. B

Row boat, unseaworthy, fiberglass or metal for children's playground. Torrance, 323-8089. B

Rentals Offered

Apt, 1 & 2-bdrm., unfurn., closed gar., pvt. patio, hot water & trash paid, \$95 & \$125 mo. Torrance, FR 5-0867, 320-7547. E

Beach Apt, deluxe 1-bdrm., w/garage, cpts., dps., furn. 1 block from beach, \$125. mo. Hawthorne, 676-0237. E

Apt, 2-bdrm., furn., gar., 5 min. from Manhattan Beach, 1 child O.K., \$130 mo. Hermosa Bch., 372-5985. E

House, 2-bdrm., in Manhattan Bch., stove & refrig., gar., encl. yard, patio, water & trash paid, \$140 mo. Palmdale, 805-947-4290. E

Apt, 1-bdrm., furn. modern, walking distance to Northrop, \$90. Hawthorne, OS 6-4734. E

Apt, lge. 1-bdrm., pool, patio, redecorated, near fwy., \$105 mo. L.A., 837-4036. E

House, unfurn., 2-bdrm., 2-bath, fam. rm., w/w cpts., dps., \$165 mo. Hawthorne, 377-0856. E

Vacation Cabins, Lake Gregory & Crestline, \$25 w/ends; \$60 wk. Venice, EX 1-2040. E

House, 1-bdrm., unfurn., fireplace, cpts., dps., bltin kitchen, gar., fenced yard, gentleman preferred, no pets, avail. Nov. 1, \$135. Manhattan Bch., FR 9-4766. E

Apt, 2-bdrm., furn., 2 blocks from Norair, laundry facilities, \$150. Hawthorne, OS 9-7123. E

Studio Apt, 2-bdrm., 2 1/2 bath, pvt. deck, sub. gar., cpts., dps., dishwasher, elec. bltins, near San Diego Fwy., adults, lease, \$180. Inglewood, 673-0615. E

Apt, 1-bdrm., unfurn., all bltins, pvt. deck, lge. pool, ample sub. parking, near Northrop, \$125 mo. Lawndale, 679-2117, 670-6084. E

Cabin, Big Bear Lake, sleeps 7 to 9, \$18 w/ends; \$50 wk. Bellflower, TO 7-0662. E

Mountain Home, 2-bdrm., 3 hrs. from L.A., hunting, fishing, \$45 wk. Torrance, DA 4-3291. E

Vacation Cottages, Idyllwild, 1 & 2 bdms., fireplace, stream, patios, \$20-\$35 w/ends; \$45-\$70 wk. L.A., PL 4-5288. E

Vacation Cabins, Lake Gregory & Crestline, \$25 w/ends; \$60 wk. Venice, EX 1-2040. E

Child Care Offered

Will babysit preschool age child at my home during day hours, have large fenced yard, 50¢ hr. Box 2105. G

Child Care Wanted

Woman to come to my home to care for 3-month infant from 7:30 a.m. to 5 p.m. Box 2106. H

Personals

Housekeeping work or babysitting wanted in Inglewood area. Inglewood, 673-1253. L

Going my way?

Rides Wanted

7 a.m. — 3:45 p.m.

Madison & 229th Place, Torrance. Barbara Senter, Norair, ext. 2075, 326-7304.

7:24 a.m. — 4:06 p.m.

Century Blvd. & Normandie, Los Angeles. Mel-lie Strand, Mariposa, ext. 4044, 757-2986, PL 5-9002.

8 a.m. — 4:42 p.m.

So. Brea & 430 W. Imperial, Brea. Peggy Thomas, Nor. Anaheim, ext. 557.

Santa Susana or Thousand Oaks to Hawthorne, Simi. Paul J. Schapp, Nor. Haw., ext. 613, 805-526-7767.

Rides Offered

8 a.m. — 4:42 p.m.

Santa Susana or Thousand Oaks to Hawthorne, Simi. Paul J. Schapp, Nor. Haw., ext. 613, 805-526-7767.

Personals

I would like to thank everyone for their kind remembrances during my recent illness. OTT STADLER. L

Fly new 1966 Cessna 150 commuters, \$7 per hr. wet, students welcome, also new 1966 Mooney Super 21, 185 mph cruise, \$19 per hour wet. Hawthorne, OS 6-6138, DA 5-5288.

Gratefully acknowledging & thanking all of you for your kind expressions of sympathy in the passing of my mother. MARGARET (MAG-GIE) SOVIE. L

Rider wanted, 8 a.m. to 4:42 p.m. from Orange County Airport by air. Box 2107. L

Small House wanted or 1-bdrm. duplex or apt., ground level, \$70. or under for Northrop retiree, contact Welfare Coordinator, ext. 4786. L

Anyone interested in chess, the Chess Club meets on the 1st & 3rd Friday at 7:30 p.m., NRC Clubhouse & the 2nd & 4th at Western Airlines. Contact Personnel Activities office, ext. 2486. L

Attn. Bowlers. Those who have not been asked to bowl on one of our leagues, there are still many openings. Contact Bill Myerson, Norair ext. 4255, Dorothy Baldwin, Nor-tronics P.V. ext. 75-456, or Vi Jennings, Norair ext. 2492. L

Room, for rent w/breakfast kitchen privilege, new home, 1 mile from Plant 1, prefer swing-shift employee. Inglewood, 676-8833. L

To our many wonderful friends at Nortronics & Norair, our sincere thanks for the thoughtfulness & generosity during the recent bereavement of our beloved husband & father. SUZIE HOWE & SONS (MICHAEL, DARRELL & MARK). L

We wish to express our sincere appreciation for your expressions of sympathy at the recent passing of our wife & mother, Fern. PAUL & JACK GIBILISCO. L

For Sale or Trade

Ham Gear, transmitter, 150W, 80 meters thru 6 meters VFO controlled & receiver, National, 270 80 thru 6 meters, \$300 or trade for 8' camper. Gardena, 327-8927. M

Bar Stools, 4, fibremold commercial wt., cor-al, molded fiberglass, swivel, stainless steel legs, full ht. backs, 28" seat height, cost \$55; \$25 ea. or trade for bar stools w/out backs. Redondo Bch., 376-9875. M

Houston

(Continued from page 3)

participate in the development, evaluation and qualification testing of propulsion, pyrotechnic and electrical power systems and subsystems.

They also provide operational support during test programs. The Thermochemical Test Area Systems Laboratory is capable of performing analyses of liquid, solid and gaseous materials used in testing and evaluation.

Something new at the Manned Spacecraft Center is the Lunar Receiving Laboratory (LRL), to be completed late next year. BRN has the contract to monitor construction, which began in August.

The LRL, an area in which the Apollo spacecraft, astronauts and lunar materials will be isolated following their return from space, will be approximately 100,000 square feet in total area.

Within the LRL, everything will be quarantined, while the astronauts, their ship and everything they bring back will be examined, tested and monitored—all from a distance.

Damman Chairs NSIA Source List Meeting

Floyd F. Damman, senior marketing representative at Northrop Norair, was chairman recently of a Washington, D.C., meeting on research and development source lists.

The meeting, on the preparation of the source lists, brought together for the first time men who have been working on the project since August.

The committee, called "Task Force No. 2," is sponsored by the National Security Industrial Association. It was organized by the NSIA Research and Development Advisory Subcommittee on Research Management, Regulations and Directives.



Named In August

Mr. Damman was named to head the committee in August, when it was formed. Members have been studying the many requirements from individual Department of Defense and National Aeronautics and Space Administration procurement agencies, as they apply to source list information.

"Our purpose," Mr. Damman said, "is to simplify the situation as much as possible."

"This meeting presented our first opportunity for getting together since the Task Force was formed. There are some things you can't accomplish while working separately, and this joint meeting provides us with a chance to make some headway."

VNAF

(Continued from page 4)

conversion flights to weapons delivery techniques and aerial combat maneuvers.

They're All Experienced

Despite its intensive nature, the program for the VNAF pilots is actually shorter than that carried out for pilots from allied nations and even some Air Force officers. That's because the VNAF pilots are already experienced combat pilots, well schooled in combat tactics learned the hard way. This eliminates the need for a portion of normal training routines followed at Williams AFB with less-experienced personnel.

Throughout their Williams AFB training, VNAF personnel, both pilots and maintenance men, will utilize Northrop-built trainers and training equipment as well as actual F-5A's and F-5B's.

Try A Real Bargain In Disneyland Tickets

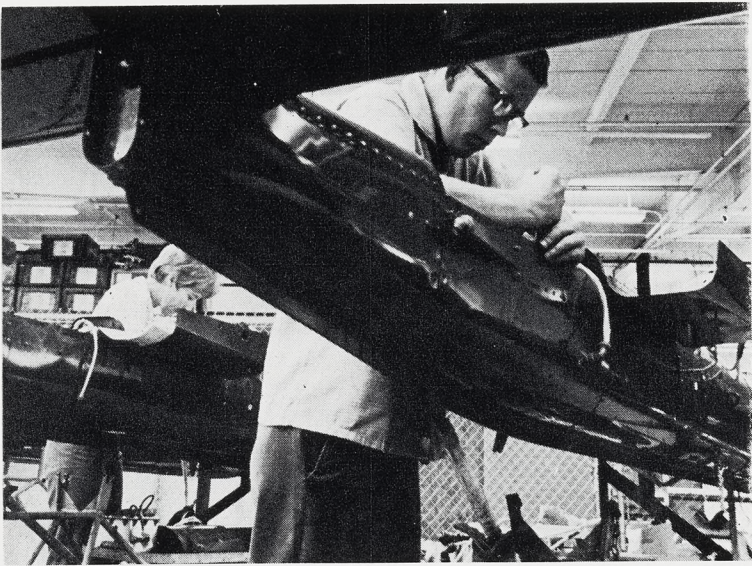
Families looking for the entertainment "buy" of the fall season might do well to consider an adventure in Disneyland Friday night.

That's when the Association of the United States Army has reserved the whole works from 8 p.m. to 1 a.m. And Northrop families are invited to share in the festivities.

The total price is \$3.75 per person which includes admission and unlimited use of all Disneyland facilities for the rest of the night without charge. That is, except shooting galleries which will charge nominal rates.

Northrop's ticket outlets have tickets now.

Updating Target Drones



MODIFYING MQM-33A TARGET DRONES under an Army contract, Betty Goodrum and Gary Barnes work on procedures. The drones, originally built by Northrop Ventura, are being modified by Ventura to provide more speed and horsepower. Horsepower is being raised from 72 to 96; speed will increase from 175 to 200 knots. Program Manager is L. H. (Hank) Campbell.

Test

(Continued from page 1)

A light wind which was blowing had no effect on the test.

"It was very encouraging," Mr. Graham said. "We plan to conduct two more bomb drop tests before testing the steering vehicle."

If the final bomb drop tests — to be held late this week or early next week — are successful, the steering vehicle drop tests may begin within a month, Mr. Graham said.

The parachute tested at El Centro is designated the 502-56. A Cloverleaf of similar size, but of a heavier weight fabric, is called the 301-56. Each will be employed once in the final two drop tests.

Derived From Tri-Lobed Shape

The Cloverleaf gets its name from its three-lobed shape. It is the result of more than five years of investigation into controllable parachutes.

The forward lobe has a formed leading edge, and the parachute's glide angle for control is by movable cloth panels in the rear. Turns are achieved by wing tip control.

The Cloverleaf was invented in 1964 by Gene Linhart, of Ventura's Fluid Dynamics branch; and Vince Riley, of Fabric Design. It followed by three years the Division's first steerable parachute, called the Glidesail.

The coated nylon Cloverleaf

has a permeability rating of 0 to 5. "What that means," Mr. Graham said, "is that the parachute is nearly impermeable. A conventional parachute might have a rating, for example, of 120 to 140, but a steerable needs to be impermeable for increased glide."

"A permeability rating of 45 would cut our glide capabilities in half."

Teamwork Did Job

Several Ventura employees had a hand in the successful Cloverleaf test. Mr. Riley singled out Dave Gold, lead engineer in Fabric Design, as the man responsible for recent modifications aiding in the success of the test.

Don Pettit of Test Engineering said Orville Reed and Jim Alexander of that branch were active on the test.

A representative of the National Aeronautics and Space Administration (NASA), for whom Ventura has a contract for design and test, also was present.

NASA specified use of the 5000-pound test vehicle because it is approximately one-half the weight of an Apollo-type vehicle.

From the results of tests with the 5000-pound vehicle, Ventura and NASA officials will determine the specifications required for a parachute capable of carrying the Apollo-sized loads.

The Cloverleaf is designed for pinpoint landing of manned space vehicles. From a height of only 10,000 feet, it can be steered to any spot within an eight-mile circle.

Largest Jig Moves To Boeing For 727 Program

The largest jig ever built by Northrop Norair—all 30 tons of it—has been sent to The Boeing Company for use in that firm's 727 expansion program.

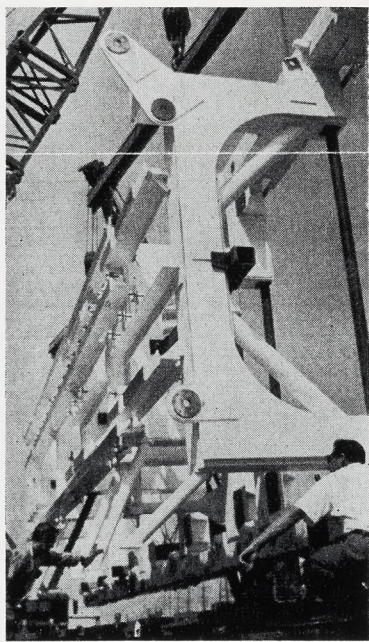
The huge tool is 16 feet wide, 14 feet high and 56 feet long. It will be used by Boeing's commercial manufacturing division for enlarging the 727 to accommodate up to 58 more passengers or an additional 7500 pounds of freight.

Despite its size, the jig is small compared to the tools expected to be built by Norair for Boeing's 747 program. The 747 fuselage radius is nearly twice the size of the 727's, and jigs for the 747 may be as large as 25 feet high, 25 feet wide and 80 feet long.

The jig was disassembled into three major sections for shipping by rail to Renton, Washington, and the sections then were lifted by cranes onto railroad flatcars.

The largest sections had to be loaded on their side, as they would have been too wide to travel on commercial rail routes had they been upright.

Because of their size and weight, it took the jigs a full week to make the trip to Washington.



A section of a 30-ton jig of The Boeing Company's 727 fuselage expansion program lies on its side as it is secured to railroad flatcar.

Company Contributes Technical Support For Nike-X Defense Development



X MARKS THE SPOT—Members of Northrop Support Operations Nike-X program staff form letters 'NX' to make sure fellow employees in Huntsville, Alabama, know they take pride in their contribution to national defense. Assigned to NSL's Huntsville department, the Nike-X staff supports advanced anti-missile missile development at Army's Redstone Arsenal.

Nike-X, the largest missile weapon system ever undertaken by the U.S. Army, is receiving valuable technical support from Northrop.

The program, one of the most advanced defense projects in development, has its headquarters in the Army's Redstone Arsenal in Huntsville, Alabama.

Nearby in the Northrop Space Laboratories Huntsville building, the 33-engineer Northrop Nike-X department supplies technical support services, including studies and evaluations in pre-production planning, for the huge system.

Nike-X is being developed as a defense against long-range ICBM's as well as submarine-launched missiles. A three-stage missile, the Zeus, is being readied to intercept targets still outside the earth's atmosphere.

For Use Against Warheads

Zeus' two-stage partner, the high speed Sprint, is designed for use against missile warheads which have already reentered the atmosphere and are at relatively short ranges.

Northrop's Nike-X project section is a part of the Huntsville department of NSL reporting to J. A. Barclay.

Heading the section is W. G. Bennett, project manager. Aiding him are Dean J. Madsen, director of Production Engineering; William E. Moran, chief of Production Planning; Robert E. Bareford, chief of Logistics and Training; Clifford M. Hoch, chief of Resources Study and Analysis; and Eric M. von Hurst, supervisor of Project Control.

Their responsibility is to provide Army personnel with independent studies in such fields as automated management systems, a work breakdown structure, evaluation of production plans and automated estimating and pricing.

Secret Classification

Also a Northrop Nike-X project function is to perform studies in production engineering, product assurance, procurement, configuration management, logistics, training, site activation, and master planning and control.

Most sections of the project carry a secret classification. Northrop work is not done at the Arsenal. Northrop Nike-X personnel meet daily to coordinate planning with Army representatives, but the emphasis is on independent work by the Northrop engineers.

Their findings then are submitted to the Army's Nike-X Project office in written reports.

The system itself is an out-

growth of planning which began in 1957, when the project then was designated the Nike-Zeus Anti-Missile Missile System.

In January 1963, it was renamed the Nike-X Missile Defense System. Northrop is in its second contract year of providing support.

To date, the federal government has spent more than \$2.3 billion in developing missile defenses. For the 1966-67 fiscal year, \$417 million has been requested for Nike-X research and development.

Carries Top Priorities

Nike-X is the only system of its type under development in the Free World. It carries top national priorities.

The job of Zeus and Sprint will be to intercept enemy missiles as they near their targets under the control of new types of radar, currently under development.

Most of the Northrop personnel in the Nike-X section live in fast-growing Huntsville. In the 1930's, the city's sole claim to fame was as the "watercress capital of the world."

In 1950, there were still only 17,000 residents.

Today, Huntsville is completing a \$12 million jet airport, has 150,000 residents, making it the state's third largest city, and if growth continues will be second in population soon.

Aerospace workers in the area often take advantage of the mild Southern climate to go hunting, boating, fishing, hiking, camping, swimming — or just picnicking with their families.

In the words of Bennett, project manager for Northrop:

"Northrop is fortunate to be participating in the planning of such a large defense system as the Nike-X. Especially so in Huntsville, a progressive center of aerospace activities."

Miniko

(Continued from page 1)

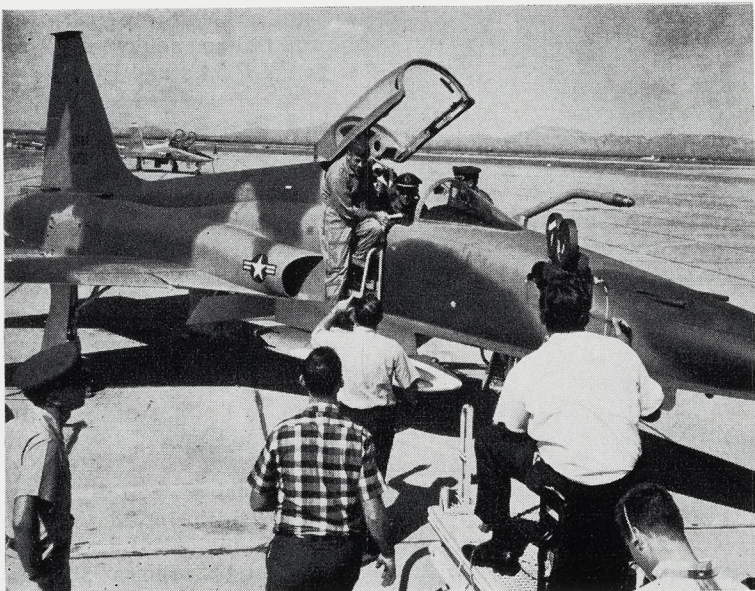
Christmas candles, has been named MINIKO.

Spring-loaded tie-down straps are used by motorists who have an oversize load in their car trunks.

It consists of a spring with a hook at each end. One hook is placed inside the trunk; the other, attached to the rear bumper.

Working with Mr. Finch in Junior Achievement are Roger Marshall, Chuck Taylor, Andy Andrews and Sherry Cable.

NBC Reports On F-5 In Action



WE'LL TRY A CLOSEUP NOW—NBC television crews recently visited Williams Air Force Base, Arizona, for a special report on Vietnamese Air Force combat veterans now undergoing training in the Northrop F-5. Standing on the side of the cockpit is Major William Gillette, USAF, an instructor pilot and veteran of F-5 combat missions in Vietnam. In the cockpit is Captain Nguyen Hoai, VNAF, while Captain Nguyen Hump, VNAF, is in background.

Digs Up Rare Coins In Ghost Town

Money is money wherever you find it.

Hal Hendersen found his in a dump at Goldfield, Nevada.

Mr. Hendersen is Norair's ghost town owner and collector of artifacts from the gold and silver mining era in the West (Northrop News, October 12).

On his recent vacation he was excavating an old city dump when he found a closed glass jar with bits of oil cloth inside. Nestled snugly within this cloth were eight coins, all dating back from 1907.

There was a \$5 gold piece (1881), a "V" nickel (1907), a "barber" quarter (1900) and five Indian head pennies (1892 to 1907).

On the current coin market they are worth \$36.25.

To Hal Hendersen they are priceless additions for his ghost town in Canoga Park.

NORTHROP NEWS

NORTHROP VENTURA

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November 9, 1966

Ventura Chute Recovers Modified Gemini Craft

The first test related to the nation's Manned Orbiting Laboratory (MOL) program proved successful last week, as a modified Gemini capsule coasted to a splashdown beneath a Northrop Ventura-built parachute system, the Associated Press reported.

The capsule was launched from Cape Kennedy on Thursday aboard a Titan III rocket. After completing its sub-orbital flight, it coasted into the Atlantic Ocean about 5060 miles southeast of the Cape.

A circular hatch had been cut into the Gemini's protective heat shield. Astronauts in the MOL program will use a similar hatch to enter the laboratory area. The first manned flight of the MOL is planned for 1969.

Air Force officials, who conducted the test, said the purpose of the mission was to determine if the capsule could survive extreme re-entry heat with the hatch cut into the protective shield.

The Associated Press, reporting from Cape Kennedy, said the capsule "survived the punishing trip."

The 84-foot parachute was identical to those used in manned Gemini missions.

The Titan III, after releasing the capsule, then orbited four small satellites.

After splashdown, the capsule was retrieved by its intended recovery ship, the La Salle. Within minutes of the watery landing, frogmen arrived in a helicopter and attached a flotation collar to the Gemini.

Offer Prizes for Ventura Writers

Twenty dollars might not seem like the Pulitzer Prize, but that's the award for the winning entry in a writing contest sponsored by the Northrop Ventura Writers' Workshop.

Awards will be given to two age groups—12 to 18 years old, and 19 and over. Second place in each division will be worth \$15 to the author; third place, \$10.

Ben Sumner, Recreation Club bulletin editor, said entries may be fiction or non-fiction, and may be in story, article, essay, poetry or verse form. The maximum length is 1000 words.

Open To Families, Too

The contest is open to employees (and their families) from Northrop Ventura, the Nortronics Applied Research department, Ventura's Aero Instrument Facility, and any Northrop employee assigned—even if temporarily—to any of those locations.

"We'd like the entries either to be typed or double spaced, on plain white bond paper, or double spaced and hand-printed in pencil," Mr. Sumner said.

Illustrations may be included, but the story should be shortened by 100 to 200 words for each illustration.

No Limit On Entries

There is no limit on number of entries, but each employee may win only one prize.

The only employees not eligible are members of the Writers' Workshop, officers of the NVRC, members of the staff of the Recreation Club bulletin, and their families.

Deadline is February 3. Entries may be given to Mr. Sumner or to Duke Powell, Writers' Workshop commissioner.

Further information may be obtained by calling Mr. Sumner on ext. 573 or Mr. Powell at ext. 1057, both at Northrop Ventura.

Management Club Dance To Be Held on Dec. 3

December 3 is the date set for the 11th annual Northrop Ventura Management Club dinner-dance, to be held this year at the Las Posas Country Club in Camarillo.

The Carroll Wax Orchestra will provide dance music, and other entertainment will include a barbershop quartet from the Conejo Valley Chapter of the Society for the Preservation and Encouragement of Barbershop Quartet Singing in America.

The country club is at 955 Fairway Drive, Camarillo. Ticket information may be obtained by contacting Don Archer on Extension 429 or Doug Finch on Extension 1100.

Begin Off-Ramp Construction

Construction was begun this month on the long-awaited Borchard Road offramp on the Ventura Freeway, near Northrop Ventura.

El Rio Construction Company of Ventura, which received a \$269,000 contract to build the offramp, began staking out the construction area in October.

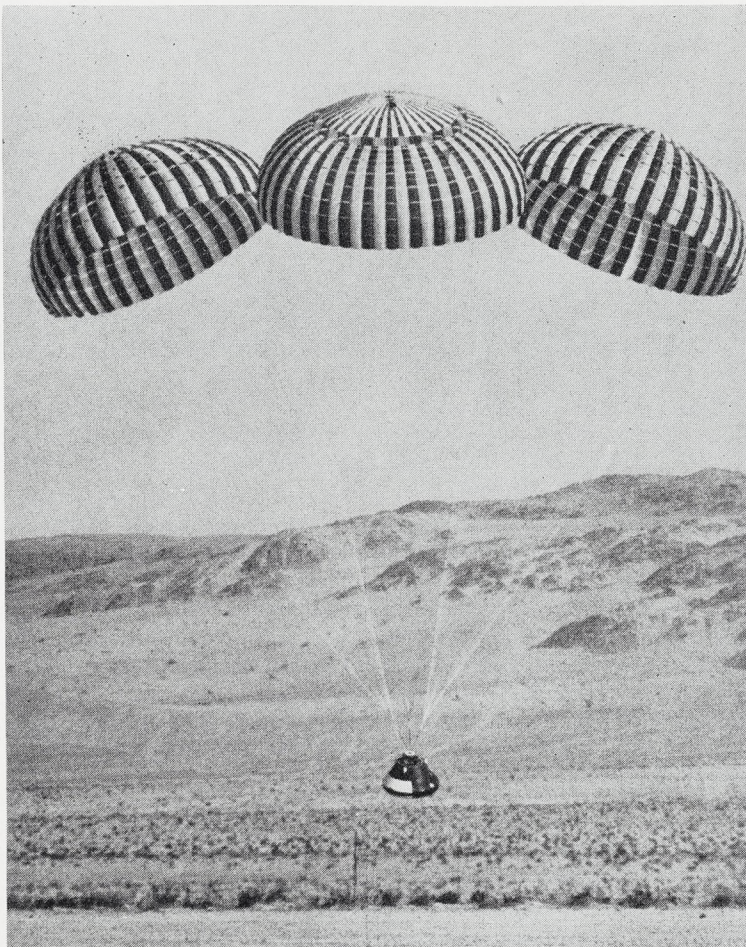
Under terms of the contract, the firm will have 105 working days to complete the project. A company official has estimated it will take only 90 to 100 days.

The offramp will permit westbound traffic to leave the freeway and go north onto Rancho Conejo Boulevard without having to cross the road from the west. At the present time, the one westbound offramp has a 180-degree turn, doubling back to Rancho Conejo Boulevard.

Traffic in the area is expected to be alleviated later this month, when the Ventu Park overpass, a mile east of Rancho Conejo Boulevard, is completed.

The closing of the Ventu Park offramp, three months ago, contributed to traffic snarls from the freeway in peak driving hours.

Block II Apollo Landing System Passes 1st Aerial Drop Test



ONE SECOND BEFORE TOUCHDOWN, the Apollo Earth Landing System floats its dummy capsule to the sands on the desert at the Navy's Air Facility in El Centro. This was the first test of the Block II parachute system. It was held on October 19. Note the pilot parachutes, at the extreme upper left and center areas of the picture. (Photo by Bob Thornton).

Bob Thornton In Feature Spot In National Industrial Photo Magazine

A Northrop Ventura photographer has been featured in a four-page article in a nationally circulated industrial photography magazine.

Bob Thornton, who originally joined the Ventura Photo Lab staff in 1956, was the subject of a story in a recent issue of "PMI" (Photo Methods for Industry), a monthly magazine.

The magazine used five of Mr. Thornton's more unusual photographs and told of his winning an award from the National Art Directors.

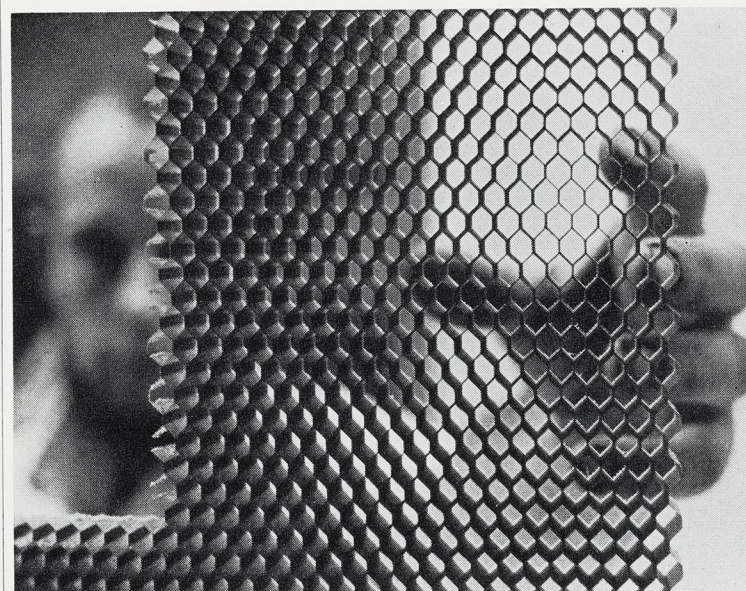
One of Thornton's most recent pictures is that of the Apollo Earth Landing System, built by Ventura, shown above.

Only Few Months

Thornton had been at Ventura only a few months when he joined the U.S. Air Force, in which he served for four years.

In 1961, he left the Air Force and returned to work at Ventura.

Thornton attended Chaffey College and the Los Angeles Art Center School. He and his wife, Yolanda, have three children.



A UNIQUE VIEW of a section of honeycombed fiberglass is provided by photographer Bob Thornton in one of five of his pictures featured in a recent issue of an industrial photography magazine. The honeycomb material is of a type used at Ventura in many fabricating operations.

A success was scored in the initial test of the Apollo Block II Earth Landing System under development for NASA by Northrop Ventura.

In the October 19 test, right on schedule, the three-parachute Earth Landing System was dropped from a C-133A carrier in conditions simulating a high-altitude abort.

Six minutes and 12 seconds later, the Ventura-built system touched down on the desert, at the U.S. Naval Air Facility in El Centro.

"The vehicle exhibited good stability through the free-fall period," an official report issued by the Apollo office said.

"Extraction and deployment of the main parachute was uniform, and the chutes opened normally in the reefed condition."

All Chutes Opened Normally

All three chutes achieved full open normally, and the subsequent descent to impact was without incident. Automatic disconnect of the chutes occurred at touchdown.

Impact site inspection of drogue, pilot and main parachutes showed all to be in excellent post-flight condition. On a preliminary basis, the test is considered to be an unqualified success.

The second drop of the scheduled six-test series will simulate abort conditions at the pad.

"The test will be unique," Leon Scrydloff, project engineer, said, "in that the drogue chutes will be deployed within two seconds of the brake chute disconnect time, as opposed to the normal 12 seconds."

Those conditions are designed to simulate the early manual use of the drogue parachutes by an Apollo astronaut.

"Ordinarily, in the automatic sequence, the drogue parachutes will be fired about 12 seconds after the brake chute disconnects," Mr. Scrydloff said.

To Simulate Manual Override

"In this test, the objective is to simulate the astronaut's early manual 'override' of the automatic system."

Division Named Finalist In Anti-Sub Competition

Northrop Ventura has been selected as a finalist in the recently concluded competition to select a contractor for development and manufacture of an anti-submarine warfare target for the U.S. Navy, it was announced November 3.

George F. Douglas, vice president and general manager, congratulated all division personnel who participated in the design studies and proposal effort.

"We are pleased," Mr. Douglas said, "that Northrop Ventura has been selected by the Naval Ordnance Systems Command as one of the finalists in the Mobile (See ANTI-SUB, Page 6)

How Company Scientists Contributed To Metals Bonding Advance Bringing SST Closer To Production

Each advance in aerospace technology is marked by a point in time when basic research gives way to applied research and development, when ideas are transposed into hardware.

In the evolution of concepts, techniques and processes, this period is a crucial one, touching each product line and directly affecting new business. It can be a stumbling block or a catapult.

Northrop Corporation concentrates many of its resources to bridge this gap—the wide chasm between the possible and the practical.

Approaches 10 Years

Engineers, scientists and technicians, research specialists, test personnel and planners, tooling and equipment experts, machinists and assemblers, administrators, buyers and schedulers, have a part in the over-all effort.

To say one group, individual or function is more important than another is presumptive. But some functions, by the very nature of their problems, perform more extensively in this field than others. It may be Process Control, Materials Research, Engineering Research Laboratories or Manufacturing Research and Development, to name a few.

The latter group at Northrop Norair, now approaching its 10th anniversary of service, is typical of all. It contains less than 40 employees, but has made a marked impact on Northrop's reputation as a leader in the advancement of aerospace production technology.

Over the past 10 years this group has taken an active role in advancing techniques in diffusion bonding of metals of all types; in production welding, plastics, in electronic machine and process control and electrical radiant heat work, in metal forming, shaping and cutting, and in a wide variety of processes and procedures.

Of particular interest are contributions helping Northrop reach



EMPHASIS ON PEOPLE—Talented individuals, like those above, are given primary credit for successful Manufacturing Research and Development effort at Norair. Men have broad knowledge of many fields, yet specialize in

one or more. They keep up with the many developments in this field. Most are Northrop veterans. Group above has served Northrop a total of 350 years. They are part of the many Northrop people contributing to progress.

a position of prominence in the field of forming, welding, machining and bonding of various metals—titanium in particular. Aluminum, alloys of many types, magnesium, columbium, molybdenum and tantalum and various forms of stainless steel have also been the objectives of extensive work on USAF contracts.

Successful Bonding

The first known successful bonding of thin titanium with honeycomb sandwich material was accomplished by this group to build solar panels for the Surveyor moon-probing satellites.

The Nortobraze radiant brazing system which opened the doors to the use of high-intensity quartz lamps for brazing of aerospace metals attained a great deal of its emphasis within Manufacturing R&D at Norair. This technique promises outstanding results with the coming of supersonic transport program. Nortobraze licensees are producing equipment for/or in the U.S., Canada, England and Spain.

A titanium producibility program at Northrop also commands a great deal of time within Manufacturing R&D.

Despite its accomplishments in helping establish and develop new techniques and processes, Norair's Manufacturing R&D organization is primarily concerned with the practical application of new equipment and methods developments and their relationship to production, today and tomorrow.

"The solution of production problems today is always of primary concern to us," says Barny Gaiennie, chief of Manufacturing R&D. "However, we are constantly looking ahead to new possibilities, new concepts and new ideas for us tomorrow."

Because Northrop has pioneered in developing certain new ideas and new techniques in aerospace work, Norair's Manufacturing R&D organization finds itself in a unique position—it handles internal problems when required on a routine basis. But is also an income producing element.

Income is derived and work done in the Norair areas of interest from the performance of applied research and development for outside interests, governmental and private, and from the li-

censing of certain rights to data related to Norair developments.

From Use Of Data

"We are working with Product Licensing toward an annual goal of \$100,000 derived solely from the use of data," Mr. Gaiennie said. "This income will come in without the capital outlays normally associated with equipment, facilities and personnel. It will come strictly from knowledge."



Mr. Gaiennie

Although Manufacturing R&D operates a modest workshop where experimental and developmental work is carried out, along with small-lot production and first product fabrication, it relies heavily upon the talents of an unusual group of individuals for the majority of its successes.

These are the 14 senior research engineers, three research engineers and a group of supporting personnel that are the experienced core of the organization.

(See R&D, page 5)

Research Agreement Made With Schools

Northrop Corporation has entered into a research agreement with five universities by joining the schools' Industrial Associates Programs.

The universities and programs are:

Massachusetts Institute of Technology Industrial Liaison Program; Case Institute of Technology Associates Program; California Institute of Technology Industrial Associates Program.

Princeton University Corporate Associates Program in Aeronautical Engineering; and Stanford University Industrial Affiliates Program in Aeronautics and Astronautics.

The programs are administered through the corporation's University Relations Advisory Board.

November 26 Slated As NRC Dance Date

Northrop Recreation Clubs are going all out in planning the big all-Northrop Holiday Dance set this year for November 26 at the famed International Hotel.

For instance, three major facilities, the International Ballroom, the Rose Room and the Blue Room, have been reserved exclusively for the use of Northrop folk.

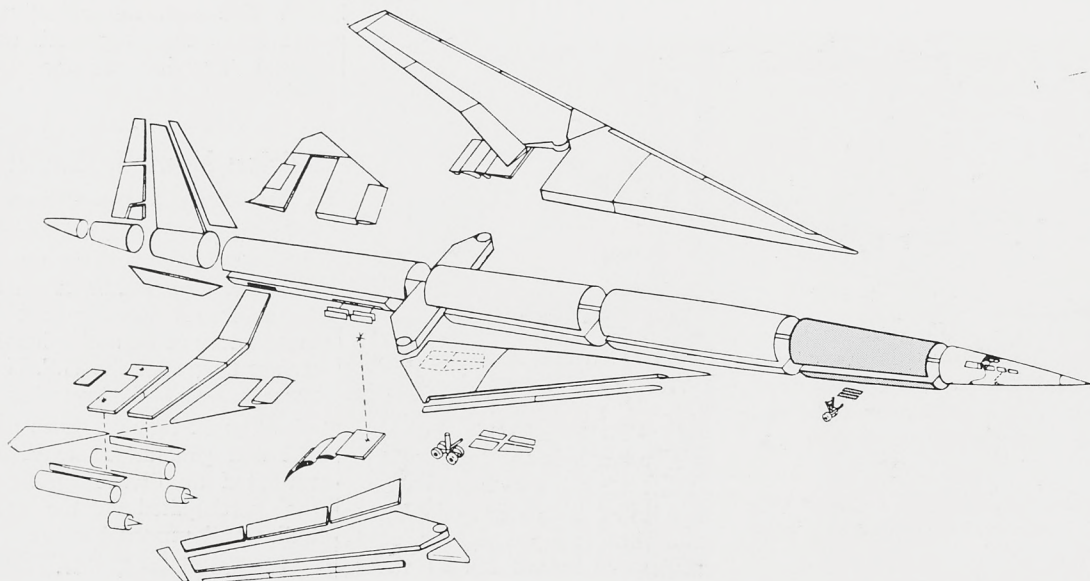
Alvino Rey and his Orchestra, the Latinaires and the Guideposts will provide music in the three facilities respectively, giving dancers an opportunity to choose their entertainment.

The cost is a low \$2 per person. Tickets are now available at all Northrop ticket outlets. Validated parking will be available for either \$1 or 50 cents.

NRC Gets Pool Table

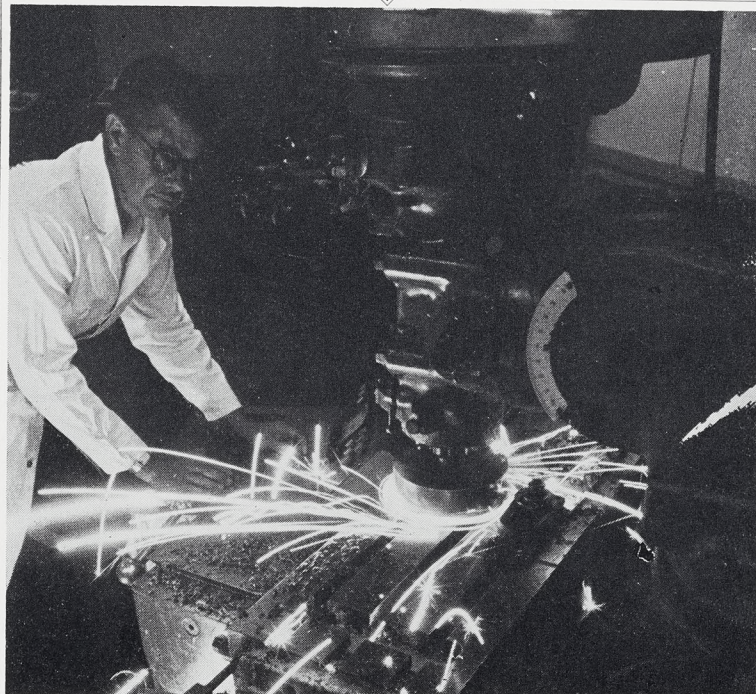
A regulation billiard table is the latest piece of equipment added to the NRC Clubhouse, Hawthorne. Located in the old executive dining room, the table is available for lunchtime and afternoon play without charge.

SST ANATOMY



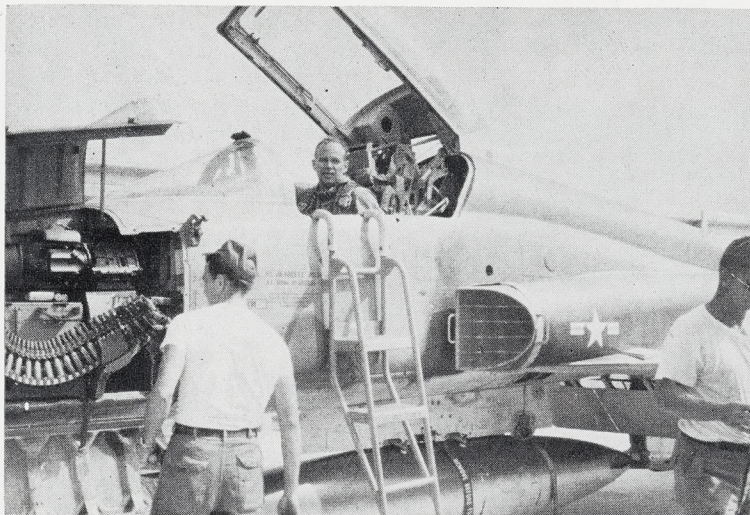
Shaded area of sleek jet airliner which The Boeing Company has entered in supersonic transport competition is portion for which Northrop may contribute. Under Boeing's "total program" plan, Northrop Norair and five other

aerospace firms will be assured the opportunity of a continuing part on the SST and will share in \$1.5 billion in subcontract work. The technique of titanium brazing (see story) helps make SST possible.



TOWARD TITANIUM TECHNOLOGY—Fred Yunt, research assistant, uses rotary insert cutter he developed to machine titanium alloy. Tiny particles are ignited by air, trace fiery patterns. Work is typical of Norair Manufacturing R&D efforts to advance technologies, devise new methods and improve production techniques for today's and tomorrow's products.

ORIGINAL SKOSHI TIGER PLANE



COMBAT VETERAN of over 270 missions is Captain Robert E. Kennedy shown returning from last mission on recent tour of duty. The airplane, a Northrop F-5, was one of the original Skoshi Tiger aircraft. Captain Kennedy had high praise for F-5 performance.

AF Captain Has High Praise For Our Product

Captain Robert E. Kennedy, who has logged 270 combat missions in many FAC-type aircraft while in Vietnam has particular praise for the F-5.

According to Donald M. Kindy, Northrop technical representative, Captain Kennedy particularly emphasized the ease of taxiing on the ground and the outstanding maneuverability of the F-5 once airborne.

His last mission on his present tour of duty was in an F-5, an airplane that was one of the original Skoshi Tiger aircraft. He pointed to the cat-like quick response of the F-5 as one which made the aircraft particularly advantageous to pilots.

Corporate-Wide Facilities Meeting Held at Norair Oct. 25-26

A corporate-wide facilities conference was held during October 25-26 at Norair. Purpose of the conference was to enable facilities executives to exchange views and study methods of modernizing and expanding equipment and facilities.

Keynoting this theme, R. R. Nolan, senior corporate vice president in charge of Manufacturing and Administration, pointed up ideas on successfully achieving these objectives. The conference was directed by Jack Hinchliffe, corporate director of Facilities who chaired the two-day session.

Among the 27 Facilities personnel who attended were: Ralph Carlson, Northrop Carolina; Dick Shaughnessy, Needham; Larry Freeman, PPD; Gerry DuKet, Nortronics Palos Verdes; Jim Adams, Haw-

thorne; Joe Rafter, Anaheim; Alex Cairns, NARD; Mike Nolan, Corporate Data Processing; Willard Lindstrand, Dick Dahman, Harold Ritter, Jack Conroy, Milt Uhler, Vint Higbie, Ernie Rogers, Jim Hauser, Paul Spikula, Fred Kratz, all of Norair; Walter N. Mann and John Evans, Ventura; George Dunbar, Dayton, Norair and Messrs. Nolan and Hinchliffe.

You May Be Hawaii Trip Winner!

A Christmas holiday in Hawaii for free?

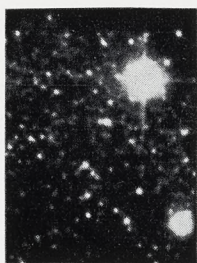
Could be, if by December 7 you've signed up for the year-end trek and paid your fees. That's when one name, from all signed up, will be drawn at random for a free trip.

Departure date is December 24 and return date, January 2. In between will be visits to Hilo, Kona, Maui and Oahu. The cost is \$358 for adults, \$258 for youngsters under 12 years.

Information is available through Personnel Activities offices.

AD ASTRA PER ASPERA

Dr. Fallis In Lecture Series On Lifting Body Research



Dr. William B. Fallis, project chief of Northrop Norair's Lifting Entry Systems group will discuss research in that field Wednesday, November 16, at Northrop Institute of Technology in Inglewood.

The lecture is one of a series of faculty sponsored meetings. It will begin at 4 p.m. in the Student Lounge, preceded by a 3:30 p.m. coffee hour. The campus is at 750 Isis Street.



Dr. Fallis

Dr. Fallis has been involved in Lifting Entry research at Norair since the National Aeronautics and Space Administration began sponsoring the program in 1964.

Before joining Northrop, Dr. Fallis was a professor and chairman of the Mechanical Engineering department at the University of Waterloo in Kitchener, Ontario. He also has taught at Southern Methodist University and Texas Christian University.

The meeting is open to the public.

Travel To Paris

Northrop scientists have traveled as far as Paris, France, in recent weeks, presenting technical papers on subjects as diverse as "Reconsidering Systems Analysis of Theater Air" and "Numerical Solution for Transient Scattering from a Hard Surface of Arbitrary Shape."

Charles H. Bernstein, director of Norair's Systems Evaluation section, was in Paris Sep-

tember 20 through 22, discussing his "Theater Air" topic at a NATO Symposium on Defense Resource Allocation.

Dr. K. M. Mitzner of Norair Electronic Systems Research gave an oral presentation, illustrated with slides, of his "Transient Scattering from a Hard Surface" topic on Saturday in Los Angeles.

He addressed a convention of the Acoustical Society of America, on the final day of a four-day meeting.

On Tuesday, Paul H. Von Essen, manager of Norair Technical Operations, spoke before the Society of American Value Engineers, meeting in Los Angeles. The panel discussion in which he participated was titled:

"Unique Approaches to Integrating Value Engineering into the Management-Operation Cycle."

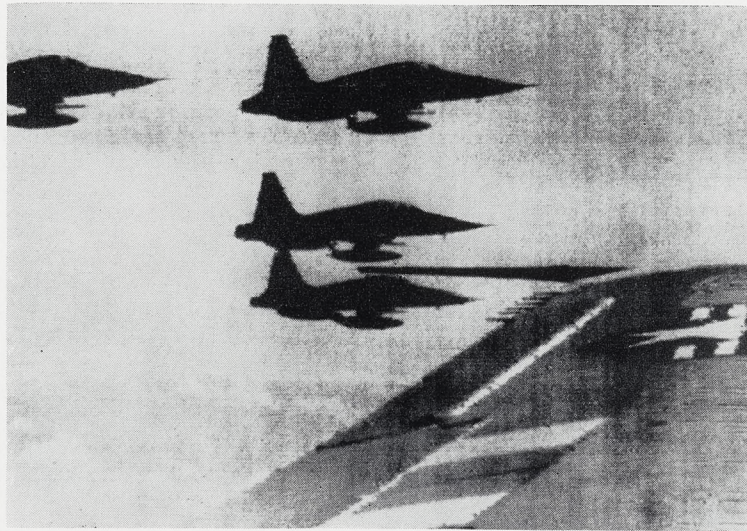
Attend Orientation

Forty employees from Northrop Nortronics have attended the initial orientation sessions of a planned program to introduce new computer users to Northrop Data Processing services and practices.

The meetings were held at NDP's Computing Center in Hawthorne. NDP supervisors conducted both sessions.

Among the subjects discussed in the three-hour sessions were data transmission, operating system, job processing, use of forms, library services, sources of technical information, and the 360/65 computer complex.

F-5'S ESCORT PRESIDENT



ESCORT OF F-5 fighters flew close to wingtip of President Johnson's airplane during its flight to Thailand. This photo, courtesy UPI, transmitted by radio from Thailand appeared in papers all over nation.

KOREAN PRECISION FLYERS



PICTURE BOOK PRECISION—The Black Knights, Republic of Korea Air Force aerobatic and precision flying team, flash by in their Northrop F-5's in close formation. Note distinctive ROKAF markings and faint vapor trails at wingtips. Black Knights were a hit at recent Korean Armed Forces Day observance, later flew special demonstration for USAF Chief of Staff, General John B. McConnell.

Time To Make Your Holiday Plans Here

A regular holiday, a floating holiday and a normal weekend combine later this month to give Northrop Corporation on the West Coast a four-day holiday, the first of the year.

Thanksgiving Day, November 24, is a regular holiday. One of Northrop's two floating holidays will be observed Friday, November 25. Regular work shifts will resume Monday, November 28.

Named Man of Month

Technical Sergeant George W. Hall was named maintenance man-of-the-month for the Northrop F-5-equipped 10th Fighter Commando Squadron in Vietnam during September.

Sergeant Hall kept his F-5 in commission, the highest rate of all aircraft in the unit, never missed a sortie and was credited with additional sorties diverted from other aircraft.

A Savings Bond registered in co-owner form becomes the sole and absolute property of the surviving co-owner in the event of the death of the other.

On the Scene F-5 Evaluation



CONFERRING WITH AF officers on F-5 performance Northrop representatives on the scene at Bien Hoa Air Force Base in Vietnam get firsthand information. (L. to R.) Lt. Colonel Robert F. Titus, commander, 10th Fighter Commando Squadron; Art DeBolt, manager, Pacific area, Northrop; Frank Perego, Norair vice president and manager, Marketing, and Colonel Wiltz P. Segura, vice commander, 3d Tactical Fighter Wing.

Nell Langston One Of Four Huntsville Girls In Fashion Show



BRIGHT COLORS were a feature at a travel fashion show at which Nell Langston, a NSL Huntsville department receptionist, modeled this blouse and capri pants ensemble. She was one of four Huntsville secretaries featured at the fashion show.

Nell Langston, a receptionist at Northrop Space Laboratories' Huntsville department, was one of four Huntsville women featured recently in a vacation fashion show.

Mrs. Langston modeled brightly colored capri pants and a fiesta-styled multi-colored silk blouse at the luncheon, held in Huntsville's Sheraton Motor Inn.

The show was presented by Delta Airlines. All the models were secretaries from aerospace firms in the Huntsville area.

Basketeers Ready To Start Tossing

Hook shots . . . jump shots . . . free throws.

It's basketball season again and NRC has reserved two local gyms for practice sessions, Lawndale high school on Saturdays (9 a.m. to 1 p.m.) and Leuzinger's girls' gym Mondays and Thursdays (6 to 10 p.m.) for teams and individual practice.

Regular NRC competition begins shortly after the first of the year. Application forms for individuals and teams are now available through Personnel Activities.

QST All Hams, Big QSO Nov. 15

Amateur radio enthusiasts among Hawthorne area facilities are being invited to a special organizational meeting set for 5 p.m. November 15 at NRC Clubhouse, Hawthorne.

Bill Anderson is guiding a group interested in forming an NRC-sponsored radio club. He may be reached at ext. 1933, Norair, for details.

Information-Protocol Center Helps Put Northrop's Best Foot Forward

Could you, the caller asked, tell me the name of the president of a major European industrial firm and if he is married, his wife's name?

An unusual request?

Not if you happen to be Curtis L. Burdett of Northrop Norair's Customer Relations department.

Curt Burdett operates a customer Information and Protocol Center. He answers questions like this each day from information on hand or sources available to him.

Visit Burdett's office and you are immediately reminded of the office of an editor of a country weekly—a hodge-podge of books, files, cards, directories, reference material and general information.

But don't let the look fool you.

Curt knows exactly where everything is and can answer most queries in the time span of a telephone call.

Six Years of Data

Burdett has been compiling his data for the past six years and adds a little more each day.

Much of the information concerns people. Names, locations, ranks, titles, affiliations, biographies and background data is available in depth. It covers military and governmental leaders, men of science and industry from nations around the world.

Northrop Corporation personnel conducting business on a world-wide basis find the center extremely helpful.

For this reason Customer Relations makes Curt Burdett's services available to all Northrop personnel.

Protocol information available at the center is another service.

Northrop representatives planning visits to other nations often check with Curt Burdett before they leave. They find out the correct etiquette to follow, how to address leaders, how to recognize military rank and what not to do while visiting some countries.

How To Talk To Royalty

For instance, four Norair hourly-rated employees were selected to represent Northrop, along with key leaders, at turnover ceremonies for the F-5 in Norway. Their visit included state dinners and the occasion to meet and talk with royalty.

"We discussed customs and protocol at length and the men took the time to learn everything they could about Norway, its leaders and ceremonies," Burdett said. "They were a success."

Religious customs are also important to world travelers and Curt Burdett has accumulated much data in this field.

For instance, how Muslim followers observe Thursday and Friday as their "weekend," put significance on dietary restrictions, and even observe once each year a month-long period in which food is not taken during daylight hours. It is important travelers know and respect these customs.

Observe Holidays

Other nations observe religious holidays and customs the traveler should be acquainted with.

It would require too much space to list the many volumes of reference material Curt Burdett maintains. But he is sure he can find the answer to almost any question in due time.

One unusual feature of his



ANSWERS UNLIMITED—C. L. (Curt) Burdett and Linda Cott turn to one of the many volumes in their customer Information and Protocol Center to answer a query. Customer Relations function at Norair provides data of many types to world-traveling Northrop personnel, including names, places, correct protocol and other little-known facts.

service is flags. He has miniature flags of just about every nation. And he has information on ranks and insignia of most military organizations around the world. He also maintains extensive listings of military abbreviations that often require interpretation for the un-informed or even the informed.

Curt Burdett is well-equipped for his job, both in what he has at hand and in background. He was in the Air Force for 20 years, including 17½ years as a master sergeant. He has served in the nation's protocol center, Washington, D.C., for more than eight years among other important points.

He may be reached at ext. 1366 at Norair.

Mineral Hunter Greenwood Wins L.A. Fair Blue Ribbon

A case of cabochons (made from petrified wood, agate types and obsidian) won a blue ribbon and a trophy at the Los Angeles County Fair for Bill Greenwood. Mineral hunter Greenwood (Research Laboratories Instrumentation group) made a family project of entry with wife, Elinor, and children Helen, Monty and Danny, working to collect the materials during trips taken with the Gem and Mineral Club. Wife Elinor is Club secretary. The entry was given a high rating of 91 points by Fair officials.

Officials Take Time Out To Help Boy Scouts

R. J. (Ross) Miller, Nortronics vice president — Technical, and four other executives took time out from busy schedules recently to sponsor Boy Scout honorees.

The honorees, Scouts who have attained the Eagle rank during the past year, were feted at a Recognition Dinner held October 13 at the Hollywood Palladium. Each honoree was sponsored by a business executive.

Joining Mr. Miller for this annual affair were Nortronics' G. C. Chalmers, Lloyd Balsam, Mike Turney and Hal Janssen.

Interest received on United States Savings Bonds is not subject to state or local income taxes.

Indoor Flyers Hold Nov. 17 Meet at Leuzinger High

Norair's model plane enthusiasts are holding their third annual indoor flying meeting at Leuzinger High School, girls' gym on Thursday, November 17 from 7 p.m. to 10 p.m.

Every employee is not only invited to attend, but the club will supply the planes with trophies to the winner.

At the same meet, a trophy will be awarded to the best appearing radio-controlled semi-scale model as well as awards to best-styled gas or rubber-powered semi-scale model plane.

Darnell Speaks to Pilot Trainees

Dan Darnell, manager of Customer Relations at Northrop Norair, was guest speaker at the October 21 dining-in honoring graduate pilots at Webb Air Force Base, Texas.

The pilots, members of Pilot Training Class 67-C, have logged many of their student hours in Northrop-built T-38 trainers.

Mr. Darnell is a former Air Force and aerospace industry engineering test pilot.

Campers To Hike in Mexico Over Thanksgiving Holiday

Ensenada, Baja California, is the key objective of the Northrop Wanderers Camping Club as they gear for their Thanksgiving Holiday hike from November 23 to 27. The campout is planned for the Granada Cove Trailer Park.

Reservations must be made in advance and will be accepted through November 22. If you wish to go, contact Personnel Activities for reservations and maps of the area.

Part of the trip will be devoted to taking collected clothing and canned foods to Ensenada area orphanages. Those who wish to contribute can do so by depositing clothing in boxes at the NRC Clubhouse, Gate 16 or the Personnel Activities office, Plant One.

If unable to bring your contribution, contact Betty Jaeger, chairman, at 374-5879. She'll arrange to pick up your contribution.

Skiers Launch Season On Thursday, Nov. 17

Skiers start gearing for their regular series of slides down the slopes when they hold their first meeting on Thursday, November 17, 8 p.m. at the NRC Clubhouse.

On the agenda is election of officers and to plan a schedule of biweekly trips to the Mammoth and June Mountain ski areas.

The meeting will feature a description of the advantages of the new Park City, Utah Ski area and a film on ski techniques.

According to Elvira Kuehnegger, Norair, ext. 2711, and Klaus Biber, Nortronics, ext. 653, future plans include special ski trips, beginner's instructions and a dance to be held at year's end. If interested in skiing, call either Klaus or Elvira.

Tennis Club Kickoff

A newly organized NRC table tennis activity for the Hawthorne area will kickoff at 7 p.m. November 10 at NRC Clubhouse. Those interested are invited to turn out and help plan future competitive events.

Savings Bonds purchased prior to December 1, 1965, when the current interest rate of 4.15 percent became effective, will earn an additional 4/10 of 1 percent from now on, which brings their rate of yield into line with current bonds.



Hey, wait a second—you guys just won this month's ZD Slogan contest!

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

For Sale
Chevrolet , 1957 4-dr. h/top, V-8 w/Power-glide trans., recent eng. o/haul, \$350. Hawthorne, 676-6423. A
Volkswagen , 1965 De Luxe, r/h, stereo, orig. owner, \$1375. West. Village, GR 9-6811. A
Cadillac , 1964 Coupe de Ville, all power, r/h, tilt wheel, new tires, low mileage, \$3300. Hermosa Bch., 372-6755. A
House , 3-bdrm., 1 1/4 bath, det. garage, spacious backyard, sprinklers, cpts., drapes, fireplace, \$24,950. Inglewood, 757-1224. A
Volkswagen , 1965 sedan, 9400 miles, steel sunroof, r/h, s/belts, \$1475. Torrance, 326-5731. A
Drums , \$150. Torrance, 329-2925. A
Toy Chest , upholstered, \$7.50. Box 2201. A
Chair , antique leather-covered oak, \$45. Playa del Rey, 823-4167. A
Skis , Kastle, 7 1/2" hickory w/Lock Nevada bindings, cable, \$40. Granada Hills, 362-2113. A
Chevrolet , 1957 Nomad, p/s, p/b & p/w, air cond., 283 cu. in. eng., \$950. Hawthorne, 679-8687. A
Stereo , Magnavox, 3-pc. component, \$100. Torrance, 328-3576. A
Desk , wood, \$50. Hawthorne, 676-1235. A
Chevrolet , 1965 Super Sport Malibu, warranty, 275 h.p., 327 eng., 10,000 miles, \$2450. Gardena, 329-9662. A
Rambler , 1964 Classic, 660, 2-dr., V-8, p/s, p/b, auto., r/h, 28,000 miles, \$1300. Hawthorne, OS 6-4231. A
Mustang , 1965 convt., 289 V-8 eng., \$2250. Rolling Hills, 547-2716. A
Hall Tree , antique, w/bench seat & other items, \$100. Gardena, 324-1566. A
Judson Supercharger , for VW, all parts & instructions, \$85. Lomita, 326-0940. A
Clarinet , Dumont w/case, \$65. Harbor City, 326-8033. A
Rifle , Marlin 39A 22, near new, \$50. Torrance, 326-6195. A
Barracuda , 1966, 235 auto., console, V-8 positrac., r/h, 8-track stereo, \$2600. Palmdale, 805-947-1867. A
Guitar , Rickenbacker, 12 string, fire-glow finish, never used, in case, cost \$350, \$250. La Habra, 691-5166. A
Mercury , 1951, good eng., \$100. L.A., PL 4-0078. A
Precision Tools , 26" Gerstner chest, suitable for inspector or jig builder, \$372. L.A., AN 9-0093. A
House , 1 1/2 miles to Northrop Ventura, 3-bdrm., custom features, dishwasher, garb. disp., fireplace, dps., cpts., landscaped, 10% down, \$22,000. Newbury Pk., 498-3043. A
Ford , 1965, 2-dr., V-8, r/h, 1 owner, \$2200. Hawthorne, 676-8724. A
Camera , 2 1/4"x3 1/4" Speed Graphic, equipped w/Kaylart range finder, Abbey flashgun, film pack adapter, 12 cut film holders, sunshade, filters & carrying case, \$50. Pac. Palisades, GL 4-7338. A
Chevrolet , 1963 Bel Air, 9-pass. station wagon, auto. trans., p/s, p/b, w/s/w, r/h, luggage rack, other extras, 38,000 miles, \$1750. Orange, 532-3743. A
Reducing Machine , deluxe Stauffer, \$95. Hawthorne, 675-6020. A
Wheels , 2 Crager "GT" mags., fit 14" Ford, Plymouth & Dodge, \$50. Inglewood, 671-2959. A
Fe refrigerator , Kelvinator, 11 cu. ft., crosstop 80 lb. freezer, \$60. Manhattan Bch., 545-3435. A
Washer , 1960 Frig. auto., \$20. Long Bch., 633-5938. A
Mobile Home , 1964 Biltmore, 10' x 40', birch paneling, lge. bathroom w/shower, Wedgewood range & oven btl., General Electric refrig., furn., near Northrop, \$3000. Gardena, 327-2698. A
Archery Bow , 35 lb., w/cover & quiver, \$20. Hawthorne, OS 6-3886. A
Honda , 305, low mileage, \$395. Torrance, 371-7956. A
Organ , Hammond M-3 spinet w/percussion, unmarred maple finish, \$750. San Pedro, 831-5837. A
Bedsread , quilted, gold, king size, \$20. Hawthorne, 676-2661. A
Pontiac , 1963 Tempest LeMans, r/h, s/belts, auto. trans., 326 eng., 2-dr., h/top, \$1450. Hawthorne, 675-1927. A
Stove , built-in-type, Pioneer oven w/bottom broiler, clock, 4-burner, \$50. Stanton, 527-5407. A
Home , 2-bdrm., on 2 1/2 acres, lawns & lots of trees, out bldgs., 24/180', \$13,000. Lancaster, WH 2-2388. A
DeSoto , 1956, 2-dr., h/top, auto. trans., p/s, p/b, \$275. Fullerton, LA 5-2516. A
Snowsuits , hand knit, sizes infant to 4 yrs., choice of color, wool, \$10; orlon sayelle, \$12. Hawthorne, 644-3235. A
Boat , small, 33 beam, 67 long, fibreglassed, \$15. Lawndale, 717-7311. A
Aquarium , 26 gal., w/variety of tropical fish, underground filter, artificial plants, fluorescent lights & stand, heaters, \$60. Hawthorne, 676-4536. A
Travel Trunk , \$10. P.V., 377-6435. A
Jacket , black broadtail, blk. dble. mink collar & cuffs, size 10, \$150. L.A., 762-9397. A
Bicycle , 20" Stelber, needs wheel repair, \$10. Torrance, 371-5916. A

For Sale
Stereo , AM/FM, Magnavox, maple cabinet, \$100. Inglewood, 675-6721. A
Buick , 1964 Wildcat, full power, new tires, 24,000 miles, \$2250. Torrance, DA 4-5422. A
Surfboard , 9'6", Bing, \$100. Hawthorne, DA 5-0543. A
Ring , 1/2 carat diamond, set in flower petal design, white gold, w/11 chips, artcarved, cost \$275, never worn, \$150. Torrance, 325-4737. A
Austin Healey Sprite , 1962, near new, good tires, \$675. L.A., PL 4-2784. A
Sailboat , Trimaran 17', \$180. Inglewood, 677-6348. A
Range , Sears Kenmore, 30", gas, 4 burners, griddle, clock & timer, glass dr. oven, broiler, rotisserie, 2 yrs. old, cost \$225; \$65. Torrance, 830-4265. A
Buick , 1962 Skylark convt., p/s, p/b, h/top, \$1095. Somis, 805-482-1186. A
Honda , Cycle, 250 Scrambler, low miles, \$595. Box 2202. A
Crib , w/Kantwet mattress, convt. high-chair, \$20. Manhattan Bch., FR 4-4780. A
Coffee Table , walnut, Danish modern, \$15. P.V. Pen., 377-9666. A
Washer-Dryer , Westinghouse elec., stack unit, aqua, \$150. Hawthorne, 377-0856. A
Dishwasher , General Electric convt. front load, can be btl., still under guarantee, \$170. Yorba Linda, 714-528-9227. A
Home , 3-bdrm., den, step dn. family rm. w/fireplace, cust. paneling, 1 1/4 bath, serv. rm., 2-car gar., btlins, cpts., dps., on .3-acre yd., \$23,850. La Mirada, WH 4-1406. A
Lot , lge. level, Lunada Bay, underground utils., \$1000 or more dn., owner will carry bal. at 6.25%, \$22,750. Rolling Hills Estd., 377-0145. A
Chevrolet , 1958, 348 cu. in. eng. 409 rac. clutch, Muncie 4-spd., Hurst 4.56 posi., hvy. duty springs & shocks, stereo & tapes, p/s, p/b, radio, many other extras, \$1400. Inglewood, 677-1495. A
Stereo Hi-Fi Components , AM/FM tuner, dual amplifiers, dual preamps, four speakers, dual cross-overs, stereo turntable, \$69. Box 2203. A
Chests-of-Drawers , 2 matching, each 30"x17" by 36" high, old English handles, walnut stained, \$8 ea. Torrance, FR 9-5690. A
Triumph , TR 2 1/2, completely rebilt, re-upholstered, \$595. P. V. Estd., 377-1860. A
Thunderbird , 1960, Lincoln engine, \$700. Redondo Bch., 375-6715. A
Cadillac , 1962 4-dr. sedan, full power, all new tires, \$1650. Palmdale, 805-947-1597. A
Violin , full size, case & music stand, \$30. Inglewood, PL 6-7681. A
Mercedes Benz , 1957, 190 SL roadster, in good mechanical cond., \$950. Lakewood, HA 9-7879. A
Hedge Trimmer , power driven, \$5. Culver City, VE 9-5438. A
Cabover Camper , 8' Parkway, lge. windows, \$800. Fullerton, 879-2857, LA 5-9633. A
Motorcycle , 1953 A-JS 500 cc single, rebilt. eng., magneto, new paint, rigged for dirt, \$275. Torrance, 371-1993. A
Pontiac , 1963, G.P., f/pwr, fac. air, just over 30 M miles, \$1795. Hawthorne, 675-4752. A
Stove , elec., General Electric, \$20. Redondo Bch., FR 5-5760. A
Refrigerator , International Harvester, approx. 13 yrs., freezer across top, 6 cu. ft., \$50. Rolling Hills, 377-1094. A
Bicycle , Schwinn, 2-spd. Sting Ray w/over-drive, orig. price \$75, \$30. Rolling Hills Estd., 325-5875. A
Motorcycle , Cushman Eagle, almost new, \$148.50. L.A., PL 5-6198. A
Scout , 1961, 4 wheel drive, full top, \$1100. Los Alamitos, GE 1-0843. A
Boat , 15' Dorsett Calypso, new in Mar. '65, 75 h.p. Evinrude, complete o/haul Jan. 1965, tilt trailer, spare wheel & tire, Coast Guard inspected, worth \$1500., \$1200. Palmdale, 947-6917. A
Volvo , 1966, 122S, 4-spd., 6 mo. warranty expires 12-5-'66, 13,000 mi., r/h, \$2200. Hawthorne, 679-7662. A
Pups , toy poodle, AKC champ, stock, 10 wks. old Dec. 1, male & female, \$100 ea. Anaheim, 714-772-2399. A
Tape Recorder , Concertone Berlant professional stereo, rack mounted in cabinet, speeds 7 1/2, 15 i.p.s., takes 10 1/2" reels, \$210. Oxnard, 486-0873. A
Guitar , elec., fender Stratocaster w/tremolo, custom neck & case, \$135. Box 2204. A
Drum Set , new hi-hat & 3 new cymbals, \$55. Redondo Bch., 371-8907. A
Corvette , 1962, 327 eng., 340 h.p., 4-spd., positraction, removable h/top, \$2000. Hawthorne, 322-2544. A
Kitchen Cabinets , 42", upper & tiled lower, dble. sink, \$20. Inglewood, PL 4-5358. A
El Camino , 1959, stick shift, \$695. Hawthorne, OS 5-7938. A
Dachshund , rare long hair, miniature-standard, AKC, born July 4, 1966, 1 male, 2 females, \$75 ea. Palmdale, 805-947-8581. A
Alpa 6c SLR 35mm w/f1.8 auto lens, ER case, \$225. Sherman Oaks, ST 8-9709. A
Honda 50 , 1965, low mileage, all std. equip. plus carrying rack, spark arrestor, knobby tire, spare tire, tool kit & lube gun, \$195. Rosemead, 288-0207. A

For Sale
Mower , Lawn Boy, rotary-type, 2 cy. eng. grass catcher incl., extra blade, \$35. Redondo Bch., FR 2-1375. A
Steering Wheel , Nardi, wood, for MGB, \$50. Hawthorne, 676-9993. A
MGA , 1960, roadster, radio, wire wheels, motor, trans. & carbs. o/haul, \$550. Torrance, 370-1838. A
Breakfront , mahogany Drexell, curved glass door, 3 dustproof drawers, 2 side drs., 18x44x70, \$120. L.A., 839-0183. A
Wig , ladies', brunette, fully styled, w/black patten leather zipper bag & insert, \$50. Torrance, 375-6467. A
Tires , 3 6.95x14, Firestone, driven 4000 miles, \$10 ea. Inglewood, 673-0703. A
Wall Module , 6 units, solid walnut, \$75. Oxnard Bch., 805-483-1876. A
Surfboard , Vellyz-Hawaiian, 9'1", \$90. Camarillo, 482-4244. A
Ford , 1965 Galaxie, 26,500 miles, air cond., p/s, p/b, \$2250. Pac. Palisades, 454-5001. A
T-Bird , 1960 convt., orig. owner, 52,800 miles, 3-spd. stick shift, new tires, clutch & trans., \$900. Manhattan Bch., 379-3003. A
Mustang , 1965 fastback, 6-cyl., 15,000 miles, \$1600. Pac. Palisades, 454-2090. A
Bicycle , boy's 24", 3-spd., just o/hailed, \$20. Huntington Bch., 714-842-5681. A

Wanted to Buy
Boat , 12' or 14', aluminum, not too heavy, one that can be carried on top of car. Gardena, 327-8927. B
Dog House , large, any condition. Torrance, DA 4-8663. B
Gun , .25 or .32 caliber automatic, good condition. Rolling Hills, FR 7-3487. B
Hardtop , for 1958 Mercedes 190SL. Inglewood, 752-7995. B
Old motorcycles , 1949-1955 BMW, h.d., Tri. & Vincents. Hawthorne, 672-1576. B

For Trade
Boat , 16' fiberglass Wizzard, 35 h.p. Evinrude, tow rope, trade for 16' travel trailer in good condition. Gardena, DA 4-7623. C
Machinists Gages , dial, telescope, hole & radius, trade for .22 cal. pistol/rifle or 20 ga. shotgun. Box 2205. C

Rentals Offered
Vacation Cabins , Lake Gregory & Crestline, \$25 w/ends; \$60 wk. Venice, EX 1-2040. E
Apt , 2-bdrm., 1 chld, furn., gar., 5 min. from beach, 1 sun room, \$150 mo. Hermosa Bch., 372-5985. E
House , 2-bdrm. & convt. den, fenced yd., water & trash pd., near schools, Leimert Park area, \$125 mo. Playa del Rey, 823-1910. E
Duplex , 2-bdrm., unfurn., rear, h/wood floors, disp., gar., yard, 1 child OK, near schools & shopping, \$95. mo. L.A., 755-0435. E
Apt , 2-bdrm., unfurn., btlins, cpts., dps., forced air heat, 2 min. from Northrop, adults only, \$120. Lawndale, OS 6-5425. E
Apt , 2-bdrm., 1 w/small fenced yd., cpts., dps., btlins, disp., closed gar., all elec., \$120-\$130. unfurn. Torrance, 375-2091, 375-9397. E
Apt , 1-bdrm., furn., disp., gar., \$87.50. Torrance, 373-1266. E
Cabin , Lake Arrowhead, secluded canyon, close to lake, fireplace, \$25 w/end, \$55 wk. N. Hollywood, 761-9645. E
Apt , 3-bdrm., furn., deluxe owner's lge. rms. & closets, 4 short blks. from Northrop, \$155 mo., incl. util. or will furn., TV set, elec. appliances & other items for \$175 mo. San Pedro, TE 3-2512. E
House , 1-bdrm., furn., fenced yard, 2 blocks south from Northrop, \$100 mo. Hawthorne, SP 2-2638. E
Apts , 1 & 2 bdrm., unfurn., pvt. deck, closed gar., btlins, cpts., dps., \$95 & \$125 mo. Torrance, FR 5-0867, 320-7547. E
Home , 3-bdrm., 2 bath, fam. rm., elec. btlins, dble. oven, fenced yd., landscaped, cpts., dps., fireplace, disp., 10 min. from Northrop Ventura, avail. Jan. 30, for lease, \$175-\$200 mo. Newbury Pk., 805-498-2235. E
Cabin , Big Bear Lake, sleeps 7 to 9, \$18 w/end; \$50 wk. Bellflower, TO 7-0662. E
House , 2-bdrm., dble. gar., fenced yd., newly decorated, covered patio, near Lennox High, \$125 mo. Inglewood OR 2-5694. E

Child Care Offered
Baby Sitting , my home, fenced yard, near Northrop. Hawthorne, 679-3135. G

Child Care Wanted
Desire mature lady, w/own transportation for part-time evening child care. Redondo Bch., 379-1049. H
Woman to come to my home & care for 2 preschool children, ages 2 & 3. Hours from 7:30 a.m. to 4:30 p.m. Gardena, 324-2784. H

Lost
Money Order signed in the name of Robert W. Voeltz, in the area of plant 2 on October 29, contact Katherine Voeltz, ext. 4216, 2nd shift or Norair Lost & Found, ext. 1972. A

Personals
House , for sale, 3 baths, 3-bdrm., lge. rum-pus rm., 2400 sq. ft. on 1/2 acre lot, 4 yrs. old, in La Habra, low down payment if buyer qualifies. Contact Norair Credit Union, ext. 1117. L

Personals
The family of Clara Hall wishes to express their gratitude for all the beautiful flowers sent in memoriam of her. MARGARET OSBORNE. L
Stake Truck , 18', & driver avail. evenings & w/ends for household moving, reasonable. Redondo Bch., FR 8-2055. L
The wife & family of Charles B. Koeller wish to express our deep gratitude & sincere appreciation to our Northrop friends for the many cards, flowers, & other expressions of understanding & sympathy at the passing of our beloved husband & father. MRS. CHARLES B. KOELLER & FAMILY. L
Pilots & students wanted to fly new Cessna 150 Commuters for \$7 per hr. wet. 4-place aircraft to be added soon, 2 flight instructors avail. Torrance, OS 6-6138, DA 5-5288. L

For Sale or Trade
Chevrolet , 1938 panel truck, 95% restored, \$500 or trade for V.W. Torrance, DA 3-1026. A
Router , Stanley mod. R2-L w/GA-65A base, 115V, 60 cps, 15 amps, 15,000 rpm, \$75 or trade for .22 caliber auto., revolver or 16-20 ga. shotgun. Box 2206. M
Volkswagen , 1962, good condition, \$1000 or trade on 1966 Variant. Manhattan Bch., 372-3878. M

Rides and Riders
Rides Wanted
7 a.m. — 3:42 p.m.
Inglewood Ave. & 165th St. , Redondo Bch. Harriet J. Chaney, Norair, ext. 2170, 370-7702. A
7:30 a.m. — 4:12 p.m.
Manchester & Vermont , Los Angeles. J. Curtis, Norair, ext. 1581. A
Washington & La Brea , Los Angeles. Gus Barnes, Norair, ext. 1095, 931-3468. A
8 a.m. — 4:42 p.m.
Carson & Los Coyotes , Lakewood. Philip A. Shubin, Nor. Anaheim, ext. 1194, 421-7029. A
Firestone & Lakewood Blvds. , Downey. Earl A. Hart, Norair, ext. 2616, WA 3-1775. A
Rides Offered
8 a.m. — 4:42 p.m.
Carson & Los Coyotes , Lakewood. Philip A. Shubin, Nor. Anaheim, ext. 1194, 421-7029. A
Firestone & Lakewood Blvds. , Downey. Earl A. Hart, Norair, ext. 2616, WA 3-1775. A

Your Voice From Home Free to Your Serviceman

Northrop employees with members of their immediate family on duty overseas or confined to any military hospital may be interested in a new program called "Voices From Home."

This American Red Cross-sponsored program allows families to record special messages to the servicemen. At the same time a Polaroid photograph is made. The message and photograph are mailed direct to the servicemen who may play the recording at Red Cross facilities around the world.

Two South Bay area service centers offer this service. They are located at 279 W. Beach St., Inglewood, and 1499 W. First St., San Pedro. Check the individual center for hours this service is available.

TIME TO POST OVERSEAS MAIL

The time is at hand for mailing Christmas items to members of the armed forces overseas, the Post Office Department reminds.

Parcels and greeting cards to be sent via surface transportation must be dispatched by November 10. Air mail transportation items must be posted between December 1 and 10.

Surface mail bound for Alaska or Hawaii should be posted no later than December 15 to insure pre-Christmas delivery.

Vocalists, Attention! Symphonaires Need You Right Now

The Northrop Symphonaires, who are making preparations for their annual series of Christmas shows, are holding auditions for prospective members.

The Symphonaires, a 30-voice mixed chorale, present their Christmas programs each year for hospitals, churches and other audiences.

Their first show this year will be on December 3, when they will sing for the Norair Management Club at the Airport Marina Hotel.

On December 17, they'll be at the First Methodist Church of Inglewood. Their own show, a version of Charles Dickens' "A Christmas Carol," will be open to the public. No date has been set.

Auditions will be held during the group's weekly meetings, which are held from 7:30 to 10 p.m., Tuesdays, at Hawthorne High School, 4859 W. El Segundo Blvd.

The director is Paul Brizuela, a former member of the Roger Wagner Chorale.

R&D (Continued from page 2)

Each senior research engineer in Manufacturing R&D is a specialist with extensive background in the shops, laboratories and production environments. He spends a part of each year on tour of key facilities across the country to determine what is being done or about to be done in his specialty field. He keeps abreast of trade publications, journals and special reports. He also serves personally on local and national engineering committees pertaining to his field. He has compiled an extensive library of background material that is catalogued and filed within the group.

The end result is a well-rounded specialist who can speak with authority on what has been done, what is being done and what may be done in his field of endeavor.

Such men and their planned extensive knowledge make it possible for Manufacturing R&D to react quickly to any situation, to present the latest facts and to offer the best possible current solution to many problems.

Currently, Manufacturing R&D is deeply involved in future programs, in work on the SST effort, the Boeing 747 program and a wide variety of others.

For example, detailed analysis is being made of the production needs for the 747 project. Typical is assistance in the design of a dual automatic riveting machine of an unusual sort.

This machine will be capable of placing from 14 to 40 rivets per minute, dependent upon the contour of the component. Each rivet placed will involve nine manufacturing operations. Thus, with two and a half million rivets per month at production rates, machines will perform 25 million manufacturing operations each month for about 10 years, or 3 billion.

SCC Awards Nov. 18

Sports Car Clubbers will present trophies to winners of the NRC Championship Slalom at their November 18 meeting. Activities start at 7:30 p.m. at the NRC Clubhouse.

Spare Time Teacher—Engineer Johnston Makes A 70-Minute Hour

Want to learn how to stretch time? Ask Bill Johnston. He's learned how to get 70 minutes of work in an hour for years. The halls of ivy have nothing on him.

The Engineering Building at Northrop Ventura isn't exactly ivy-covered, but you would think so if you go by the standards of Bill Johnston, a field test planning engineer. He has stretched time by becoming a teacher.

Johnston received an elementary teaching credential as a member of the 1966 class of San Fernando Valley State College.

With Company Since 1953

Since 1953 he has worked for Northrop. And since 1950, he had been engaged in time stretching studying for his college degree. That was the year he entered El Camino College, majoring in business administration.

He changed his major to elementary education "because I've always been interested in youth. I chose elementary, rather than secondary education, because the younger children are so eager to learn; so quick to want to know."

He and his wife, Robin, a former kindergarten teacher, have seven members in their own "class," including Robin Ann, 16; Janet, 14; Scott, 13; Mark, 10; Susan, 6; Joseph, 3; and Toby, 1.

Although his career kept him from completing college sooner, Mr. Johnston's final semester must have seemed like a five-year seminar program in itself.

Early To Rise, Late To Bed

He awoke at 6:30 each morning and made final preparations on his lesson plan for that day. Then he went to Balboa Boulevard School in Northridge, arriving before 8.

From 8 until 12:30 p.m. he taught—fourth and fifth grade pupils at the start of the semester, first and second graders later on.

Eating his lunch en route, Mr. Johnston would arrive at Northrop by 1:30 p.m., where he'd often work "until they turned off the lights at midnight. I'd have to leave then."

Then it was home to Northridge, where he'd work on the next day's teaching plans until 2 or 2:30.

The Sunday Visitor

"I only really saw my family on Sunday," he said, "and I didn't get much time with them, even then. I had to study for the following week."

As time-consuming as the semester was, Mr. Johnston said later that he considered it "time well spent." The tribulations of teaching are really nothing more than what you have at home.

"It was an interesting experience, and one which I think anyone with an interest in children could benefit by."



A FACULTY CONFERENCE finds Bill Johnston meeting with Mrs. Marybell Dahlstead, principal of Balboa Elementary School in Northridge. Mr. Johnston, a field test engineer at Northrop Ventura, spent a semester practice teaching at Mrs. Dahlstead's school, before earning his elementary teaching credential.



INTERESTED CHILDREN at Balboa Elementary School watch as Bill Johnston teaches them how to use the telephone. Mr. Johnston, of Northrop Ventura, taught first, second, fourth and fifth grade pupils during a semester of practice instruction. (Photos by Charles Ramsey).

Now that he's out of school, the engineer-teacher is finding more time with Robin Ann in her 4H Club projects ("we've got two horses, two sheep and some rabbits,") and with Scott, in youth baseball.

Daughter Janet is a Girl Scout, and Mark is, according to Mr. Johnston, "a frustrated ballplayer. He watches Scott, but he's still a little too young."

They Helped Bill

Five persons were especially helpful during that last long semester, Mr. Johnston said.

Mrs. Marybell Dahlstead, principal of Balboa Elementary School, "offered me a great deal of encouragement," he said.

Two master teachers at Balboa, Mrs. Sally Hammill and Mrs. Glenda Bensussen, also were very helpful, he said.

From Valley State, Dr. O. V. Porterfield, chairman of the Elementary Education Department, and Dr. Martha Brockman, associate professor of education, received Mr. Johnston's thanks.

He Taught Northrop Story, Too
If he never accepts another teaching assignment, a sizeable number of pupils at Balboa School aren't likely to forget him.

"Those kids learned quite a bit about the Apollo project," Mr. Johnston said. "They know a lot about Northrop's recovery systems, and how Apollo fits into our space plans."

During his vacations, he may work as a substitute teacher to keep his credential active.

"I may do that," he said. "It wouldn't interfere with my work, and it might be nice, just to sort of keep in touch with education."

Ringsail Parachute Tested With 17,000 lb. Vehicle

The first cluster test involving the largest parachute ever built by Northrop Corporation has ended in success for the twin 128.8-foot Ringsail chutes designed and tested for NASA by the Ventura Division.

A 17,000-pound test vehicle, suspended below the Century Ringsails, was dropped from a B-52 over Naval test facilities at El Centro on October 27. The weight made a steady descent onto the desert from the drop altitude of 10,000 feet.

Jack Vickers, Northrop Ventura program manager and project engineer on the Century project, said Northrop Ventura will file an analysis of test data for the National Aeronautics and Space Administration's offices in Houston.

"This was, of course, the first cluster test for the Century," Mr. Vickers said. "Our objectives have been the advancement of Ringsail technology and the recognition of the larger Ringsails as a feasible means for carrying heavy payloads."

"We believe this test successfully demonstrated that a parachute the size of the Century can be deployed in clusters. A cluster of three or four could conceivably be used, either for dropping a heavy payload, or for use in the recovery of booster vehicles."

The parachutes tested were identical to one which was dropped successfully in June at El Centro, carrying 9500 pounds. That test was the first for the Century since it was redesigned in March, using a modified one-quarter spherical shape.

Tie Mobile Units For 747 Offices

The advance group of several hundred engineers, technicians and office people on the 747 program is being housed in a unique ultra-modern series of 88 mobile office units. These units are 60 feet long, 10 feet wide, each with independent air conditioning and heating facilities. The mobile offices are joined together by beamed ceilings and locked-in flooring with harmonious wall panels. Wall panels are sound and climate insulated.

The result is a group of huge office buildings which have pleasant surroundings and working conditions which are much appreciated by employees.

In fact, many employees on the 747 project say these mobile office complexes compare very favorably with the finest in office design structure.

"The unique method of joining mobile office units together gave Norair lead time in housing necessary personnel for the 747 program," says Warren Klauer, engineering project director, 747 program.

How Relocation Will Work

This temporary housing, it is pointed out by Darrell G. McNeal, project director for 747 Manufacturing, has quickly brought together the various support groups on the program for quick communication and coordination among all project groups.

Mr. McNeal said that "beneficial occupancy" of the new Transport facility being constructed on the site of the old Plant Three will take place on December 12. Relocation of all 747 people to the new building is scheduled for early April.

—ANTI-SUB—

(Continued from page 1)

Anti-Submarine Warfare Target competition.

"Following the completion of audits by the Defense Contractors' Administrative Services, we expect to enter the contract negotiation phase."

"The management wishes to take this opportunity to congratulate all of the personnel at Northrop Ventura because it is through your efforts that we have been selected."

Toastmasters Push New Leadership Training Ideas

Toastmasters, under the able direction of newly elected president Al Monteith (Norair), have begun an energetic program to upgrade speaker eloquence. Mr. Monteith has assigned Hank Greenberger, vice president, education, to spearhead the task.

Mr. Greenberger said that the "Speechcraft" program would help participants to attain greater fluency to present ideas in concise and dramatic ways and involve phases of leadership training. He said, "Anyone, and that means the general public, is invited to participate in the program."

They're Ready To Participate

Monteith also indicated that Toastmasters stand ready to participate in divisional community relations speaking assignments where needed.

Greenberger noted that Toastmasters will engage in an annual competitive meeting with the Westchester Toastmasters, a businessmen's group, for a set of trophy bells symbolizing ringing eloquence.

He said that Toastmasters will hold a combined family Christmas party with the North American Aviation Toastmasters Club.

Doug Finch Enters National Tuberculosis Association Christmas Seal Contest

Doug Finch, a member of the Northrop Ventura Graphic Arts department, has entered a design in the 1968 Christmas Seal contest, conducted by the National Tuberculosis Association.

Mr. Finch entered the national contest through the association's Ventura County office. The prize, given to the artist whose seal design is accepted, is \$1000.

Mr. Finch has been in the commercial art business for 30 years.

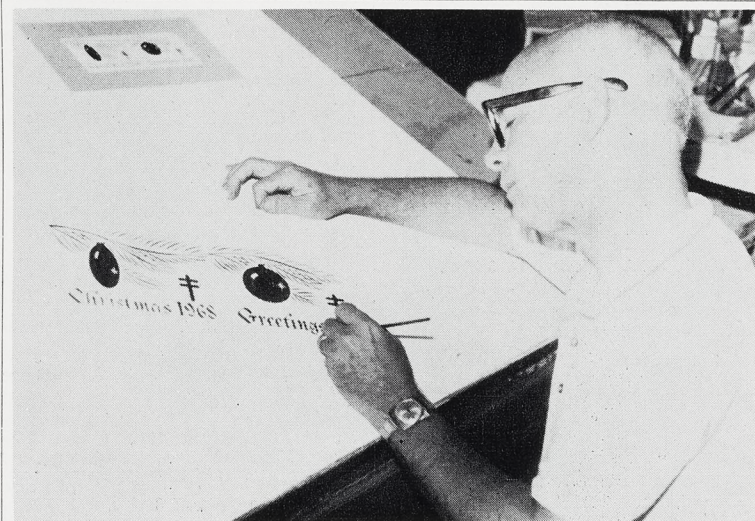
He has designed thousands of Christmas cards, most of them displaying winter landscape scenes. He was born and raised in northern Ontario, and recreated most of his winter landscapes from areas near his home.

Among his other activities are counseling Ventura's Junior Achievement company and working in the division's Management Club program. He and his family live in Newbury Park.

Bloodmobile To Visit Norair and Nortronics

Volunteer blood donors from all Northrop facilities in the Hawthorne area will turn out December 1 and 2 for a bloodmobile visit to the NRC Clubhouse.

Extra emphasis is being placed on this visit, the last of the year, to help carry blood reserves through the yearend period which traditionally means greater demands for blood and lower donations.



CHRISTMAS TREE provides inspiration for Doug Finch as he prepares his entry in the 1968 Christmas Seal contest, conducted by the National Tuberculosis Association. Mr. Finch is in the Graphic Arts department at Northrop Ventura.

NORTHROP NEWS

NORTHROP VENTURA

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Employees Earn Thanks For Gemini

George F. Douglas, Northrop Corporation vice president and general manager of Northrop Ventura, has expressed his thanks to Ventura employees for their work in the Mercury and Gemini programs.

Shortly after the Gemini 12 splashdown last week, which concluded the successful 10-flight program, Mr. Douglas said.

"The landing of Gemini astronauts James Lovell and Edwin (Buzz) Aldrin on November 15 brought to a highly successful conclusion the second American manned space flight program in which Northrop Ventura has been involved.

"Since 1958, the Division has produced the parachute landing systems for all astronauts who have flown in both the Mercury and Gemini programs.

"I wish to congratulate all Northrop Ventura personnel who have been involved in any way with these programs. You have done an excellent job, and I am confident the same excellence will continue as we move into the manned phases of the Apollo program."

The six manned Mercury flights spanned a period of two years, from May 5, 1961, to May 16, 1963. Gemini's 10 flights were from March 23, 1965, to the November 12 launch of the Gemini 12.

The first Apollo manned flight is scheduled for early next year.

NV Hosts Aerospace Roundtable

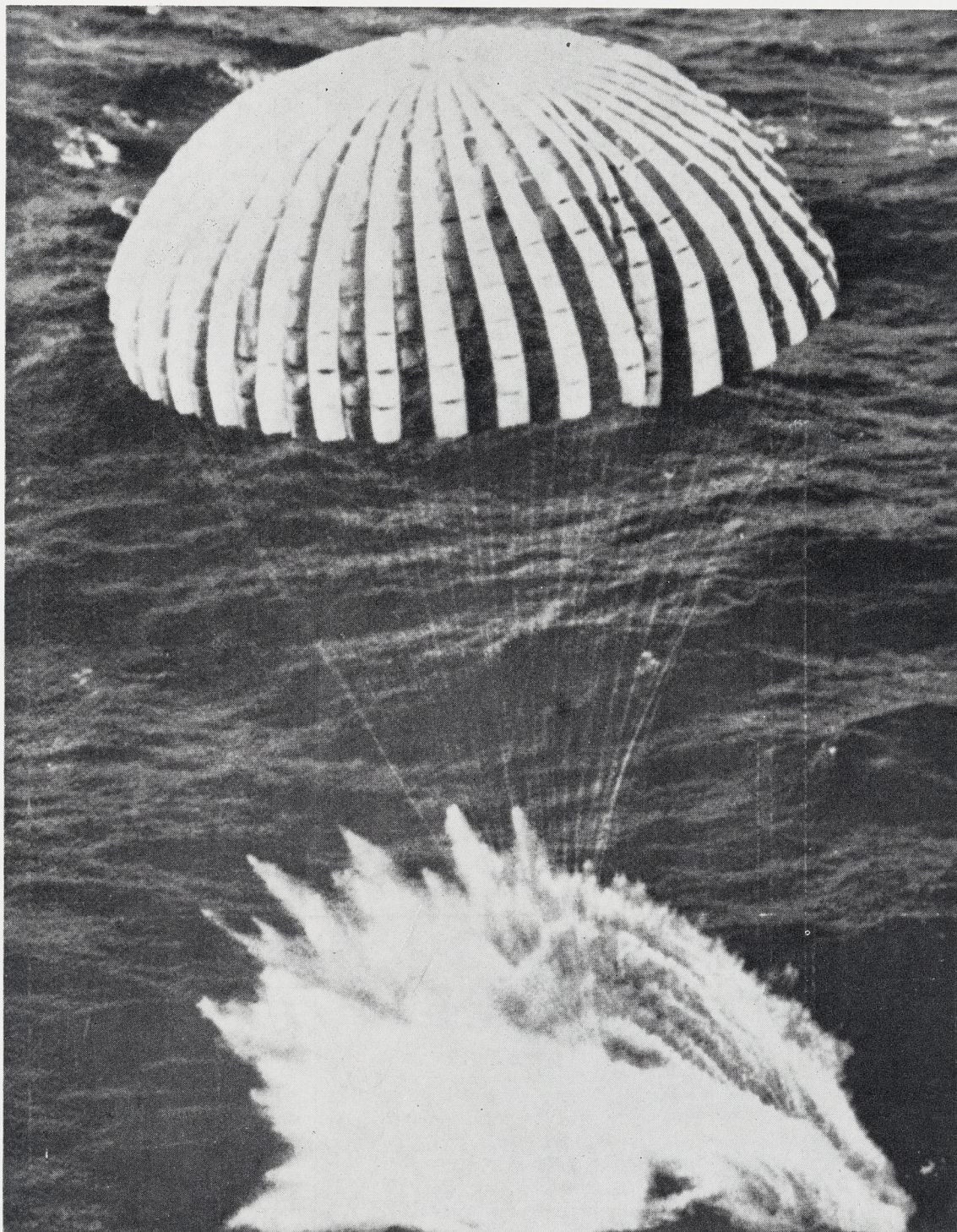
Twenty-two aerospace officials from throughout the nation met at Northrop Ventura last Friday in a quarterly session of the Aerospace Organization Planning Roundtable (AOPRT).

Two Northrop Corporation men participated. Chuck Merlian, Ventura chief of Management Systems and Organization, was host; and John Sterling, Norair chief of Organization Planning, was among the guests.

Management representatives from New York, New Jersey, Texas, Iowa and Michigan were among those attending.

The men heard John B. Joynt of New York City, president of John B. Joynt Associates, discuss "Managerial Performance Measurements."

The other guest speakers were Ken Farly and Donald Malcolm (See **ROUNDTABLE**, page 6)



NORTHROP VENTURA SCORES AGAIN as the Gemini 12 splashes into the Atlantic Ocean beneath a Ventura parachute. Ventura supplied the landing systems for all ten Gemini missions, starting with the March 23, 1965, Gemini

3. Gemini 12, carrying Edwin E. (Buzz) Aldrin, jr., and James A. Lovell, jr., splashed down on November 15, four days after its launch. Ventura has produced parachute landing systems for astronauts since 1958. (AP Wirephoto.)

OUR MAN IN FLORIDA

Ventura's Richardson Earns Thanks For Big Chutes in Small Packages

Anyone who has ever tried to stuff a week's worth of clothing into a suitcase must feel a certain envy for Larry Richardson of Northrop Ventura.

Mr. Richardson, if he applied his talents to that endeavor, could probably live from the contents of that suitcase for a month without wearing the same suit twice.

Among his duties as Ventura's representative to NASA's Kennedy Space Center in Florida was the packing of all Gemini spacecraft parachutes. He did this so well that officials from NASA and McDonnell Aircraft Corporation sent letters commending him to his supervisor, W. L. Bridwell.

The main Gemini parachute is 154 feet long, weighs 107 pounds, has an 84-foot canopy diameter and 72 suspension lines.

As might be expected, packing all those items into a space not much larger than a suitcase is a tedious, time-consuming situation.

"It takes a full eight-hour day to pack the main parachute," Mr. Richardson said. "You have to use meticulous care on each fold and on every one of the suspension lines."

Before the actual packing, several weeks are spent on inspection. Literally, every stitch is checked, and the entire surface is checked for tiny rips or holes in the nylon.

The NASA letter of commendation was sent by G. Merritt Preston, deputy director of Launch Operations at Cape Kennedy.

In it, Mr. Preston said that Mr. Richardson "is to be commended for his excellent work in preparing the Gemini landing systems for flight."

"He has put in many long, hard hours without complaint; and, as a result of his effort, there has never been a schedule slip-page or failure which can be at-

tributed to the landing system.

"Mr. Richardson's attention to detail in planning, direction and execution of his job have left little to be desired. His resourcefulness in handling the problems that have arisen shows the thoroughness with which he is qualified for his job.

"Mr. Richardson has very effectively demonstrated the type of teamwork necessary between the government and industry to have a successful space program. He can certainly go back to your plant with the feeling of having done a difficult job in a most efficient manner."

The McDonnell letter came from W. E. Mosley of Launch Operations Engineering. In it Mr. Mosley thanked Richardson for "the good working relationship between Larry, representing Northrop Ventura and McDonnell (See **RICHARDSON**, page 6)

Gemini 12 Leads Way To Apollo

To the moon and back — 36 times.

That's how far American astronauts have gone if you take their combined mileage from the Mercury and Gemini programs and project the figure against the 240,000 miles which separate the earth and the moon.

The 16 U.S. manned flights add up to 17,616,400 miles, starting with the May 5, 1961, launch of Alan P. Shepard's Freedom 7, and continuing through last week's splashdown of the Gemini 12, piloted by James Lovell and Edwin (Buzz) Aldrin.

Early Mercury flights lasted only a few orbits; the longest Gemini venture—the Gemini 7—circled the earth for 14 days, but all U.S. manned flights have been completed the same way—with a successful splashdown beneath a parachute system designed and manufactured by Northrop Ventura.

Ventura in Apollo Program

And, speaking of the moon, Ventura retains its part in the Apollo program — successor to Mercury and Gemini—which is scheduled to land U.S. spacemen on the lunar surface by 1969. The first manned flight is being planned for early next year. Two unmanned suborbital flights have already been made.

When Navy Captain Lovell and Air Force Major Aldrin splashed into the Atlantic on November 15, they extended America's total manned time in space to 1994 hours, 14 minutes and 53 seconds. Astronaut Lovell has spent more time in space than any other man in the world—a total of 425 hours, 8 minutes and 58 seconds.

The U.S. has sent 26 astronauts aloft (19 different men; seven have made two flights) in its 16 missions. The Soviet Union has (See **GEMINI 12**, page 6)

Ventura People Are Attending Boeing 747 Training Classes

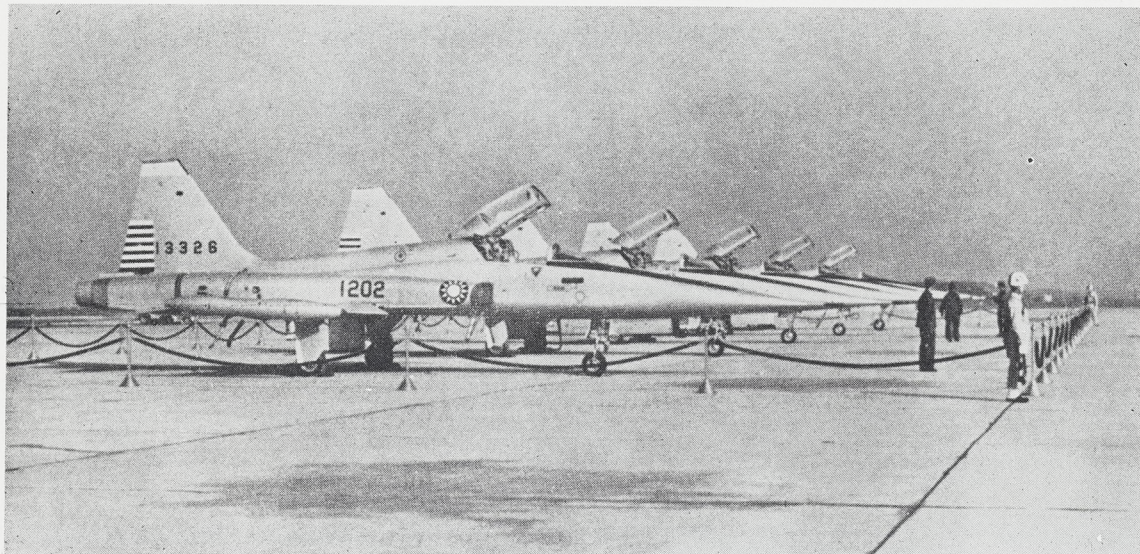
Northrop Ventura has been well represented at an intensive 20-hour instructional session on plans and drawings for the division's part in the Boeing 747 program.

Thirteen Ventura engineers attended the class, held from 8 a.m. to noon at Norair every day last week.

They are among an estimated 400 Northrop personnel, most of them from Norair, who will attend the sessions. In charge of the training is L. H. Walton, chief of Personnel Development and Training at Norair.

Fifteen Ventura men took part in a three and one-half hour planning meeting, also held at Norair, on what Boeing calls the Omnibus Concept.

(See **TRAINING**, page 6)



F-5 FIGHTERS FOR REPUBLIC OF CHINA—Northrop F-5 tactical fighters in service with the Republic of China (Formosa) Air Force are shown at Tainan Air Base, Taiwan. The first squadron of F-5s was officially turned over to the Republic of China on Dec. 9, 1965. The aircraft are seen here with the markings of the Chinese Air Force along the fuselage. Fifteen Free World countries in all have acquired

or selected the twin-jet F-5 for their defense forces. Included is the United States, which is using the 1000 mile-per-hour aircraft in Vietnam combat operations, and 14 allied nations in such areas as Europe, the Middle East and Southeast Asia among others. This total of 15 thus makes the Freedom Fighter the most-widely deployed and programmed of any modern supersonic fighter in the world.

Radhoff Is A Natural To Judge Chute Jump Contest

Competitors in sporting events share a mutual feeling that the best official is one who has participated in all phases of the sport he judges.

That's why Ron Radhoff was a natural selection to judge the 1966 U.S. National Parachute Championships held recently in Oklahoma.

Ron's credentials include:

Almost five years as a sport parachutist; more than 630 jumps; 30 individual awards in competition; extensive experience as a parachuting judge; instruction to over 20 students; and more than 100 parachutes packed as a licensed rigger.

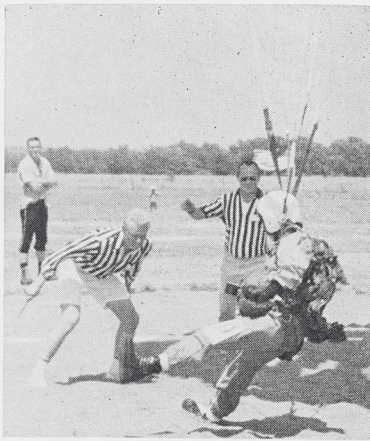
If that's not enough, Ron is also a licensed pilot and flies sky divers preparing to jump when he is not jumping himself.

Ron Radhoff is supervisor of the Technical Data and Graphic Services function at NSL's Huntsville, Alabama, operation.

He, and four others, judged the 1966 nationals which ended with the highest scores ever attained in a national event.

"This leads us to believe the United States team selected from this event will better represent the country in international competition," Ron said.

Competition at the national was held in two events—accuracy and style. In the former, jumpers aimed for a target just 5.91 inches in diameter and received points based on how near they landed to this target. Style, in contrast, considers performance during a



PREPARING TO mark landing of contestant is Ron Radhoff, NSL Huntsville, during the National Parachuting Championships. Note landing disc under contestant's right foot.

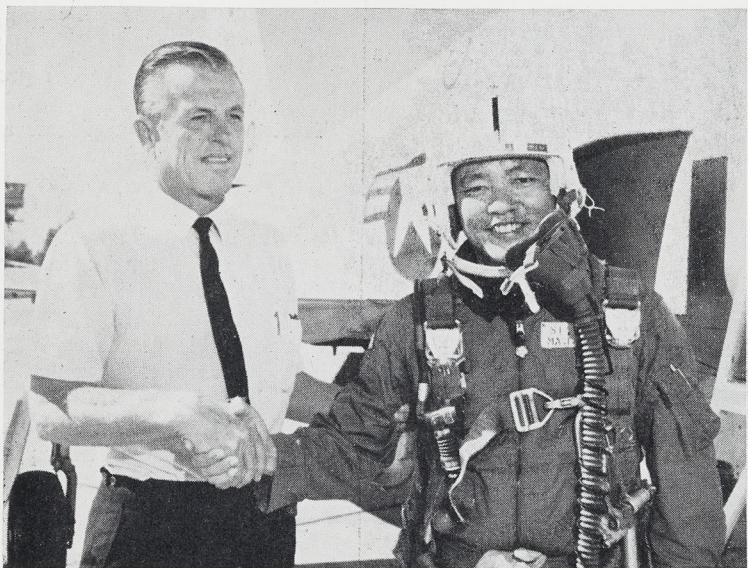
pre-determined set of aerial maneuvers while in free fall.

Long hours on the part of judges were required in the nationals. In addition to judging actual events, they were responsible for target areas, optical and timing equipment, supervision of trained judges and various other tasks. At the end of each day they calculated points scored during the day.

Ron has perfected his judging career by serving in the 1966 Southern Conference meet, the 1965 Nationals, and numerous Cottonbelt Parachute Council events.

At present Ron heads the latter Council in over-all points for both style and accuracy for the year and was style champion in 1964 and 1965.

FIRST VNAF PILOT TO SOLO—Norair's Hank Waklee extends congratulations to Major Vo Van Si of the Vietnam Air Force (VNAF) after he soloed in the Northrop F-5. The major is the ranking officer among a 33-man contingent from the VNAF now training in the F-5 at Williams Air Force Base, Arizona. Vietnam has announced plans for equipping its Air Force with F-5's.



You Can Buy Dance Tickets at Door

Special arrangements have just been completed which will allow Northrop personnel to purchase tickets to the annual all-Northrop Holiday Dance at the door.

The dance comes off this Saturday at the International Hotel.

The cost is a modest \$2 per person, thanks to the combined sponsorship of all NRC Councils. Validated parking is also available at reduced rates.

Alvino Rey and his Orchestra, the Latinaires, the Guideposts and a special intermission group will play for dancing in the International Ballroom, the Rose and Blue Rooms.

Tickets may be obtained today at regular outlets or at the door Saturday night.

New Schedules for Blood Donors

Volunteer blood donors among Northrop personnel in the Hawthorne area may now obtain a sustaining membership in the blood program which will automatically schedule them for future bloodmobile visits.

This feature begins with the December 1-2 bloodmobile visit to the NRC Clubhouse, Hawthorne.

Signup cards now available at Norair and Nortronics facilities make it possible for a donor to register once and to be called automatically for future bloodmobile visits (one is held each quarter).

NRC Commissioners Plan Coordinated Publicity

Northrop Recreation Club commissioners and publicity coordinators met on Thursday, November 10 at Rodger Young Auditorium in downtown Los Angeles to plan an integrated news function.

The meeting was sparked by Bill Wareing, Norair NRC president, and representatives from Norair, Ventura and Nortronics who decided to nominate Frank Byers of Norair as temporary news coordinator. All news of NRC will be channeled through Byers who will act in this post until a permanent chairman is named by the NRC Council.

Byers will supply both news and pictures to the Northrop News on a corporate-wide basis.

AFPR Office Monitors 150 Active Contracts

Lieutenant Colonel Rufus K. Keeling, USAF, likes to boil things down to the essentials.

His command, he says, concerns itself primarily with assuring "form, fit and function."

Which means, in the Colonel's basics, seeing that products Northrop Norair contracts to build for governmental agencies are made according to specifications, fit correctly and function properly.

The yardstick applied is contractual terms. Timely delivery of quality products within established costs are the parameters.

Colonel Keeling is the Air Force Plant Representative (AFPR) for Northrop Corporation. He heads a 71-member organization composed of military and civilian personnel.

See Photos, page 3

Currently, the Northrop AFPRO is administering more than 150 active contracts with a total value of approximately \$550 million.

Many of these cover hardware—the F-5 fighter, the T-38 trainer, replacement and supporting equipment for these and other Northrop products, spacecraft and spacecraft components, limited research and development items, et cetera. Others cover specific services, support operations, studies or proposals involving no hardware.

As a direct representative of Norair's biggest customer—the U.S. government—the Northrop AFPRO is geared to serve any governmental agency doing business with Norair.

Management Services

This may mean providing routine management services for and technical assistance to the buying agency throughout the life of a contract. Or it may call for the performance of specific tasks delegated by an agency in the interest of shortening decision making time.

Above all, the AFPRO brings the contractor and buyer face to face at the production level.

Staffed by knowledgeable personnel experienced in contractor-buyer relationships, the AFPR Office is set up to interface with many Norair organizations. Major divisions include Development Engineering, Industrial Management Evaluation, Plans and Administrative Services, Safety and Flight Operations, Contract Administration, Production Administration, and Quality Assurance. To these groups fall the responsibility of carrying out day-to-day

activities in a close-knit, teamlike atmosphere with their Norair counterparts.

More than anything else, the Northrop AFPR Office is flexible.

This makes it possible for a relatively small number of skilled people to serve the interest of many buyers, many contracts.

At any given time AFPRO staff members may be working simultaneously on contracts covering aircraft, spacecraft and proposals.

"Seeing that Norair meets its contractual requirements is our prime objective," Colonel Keeling says, "but helping you to do so is equally important to us."

"Reflected in your success, or failure, is a distinct image of the job we are doing. Like everyone else we like a winner and sharing in the elements that make a winner," he adds.

The fact Norair has not missed a hardware delivery schedule since the inception of the F-5 and T-38 programs is a point of intense pride within the AFPRO organization.

And when extra effort was required to provide "Skoshi Tiger" aircraft for use in Vietnam and subsequent follow-on activities, AFPRO personnel were in the thick of things, working the same long hours required and making personal sacrifices.

The AFPRO staff is a team set up to provide assistance to both the buyer and the contractor. It serves a unique role in keeping contract efforts moving toward timely completion.

Hawaii-Bound Tourists Slate Final Meeting

A final organizational meeting for Hawaii-bound Northrop folk will be held at 8 p.m., December 7 at the Alondra Club, 16411 Prairie, Lawndale.

At that time a drawing will be held among those who have made reservations for the trip to determine the winner of a free trip.

The NRC tour departs December 24 and returns January 2. Reservations are being accepted at all Personnel Activities offices.

A child to educate? Monthly investment of \$37.50 in Series E United States Savings Bonds will grow to \$10,964 at the end of 17 years, assuming the current rate of yield is unchanged during the automatic 10-year extension period.

RECOGNITION DINNER held recently to honor Boy Scouts who attained Eagle rank found Nortronics executives serving as hosts for five Scouts. The men (from left) are Lloyd Balsam, George Chalmers, Mike Turney, Hal Janssen and Ross Miller. Their guests are shown with them.



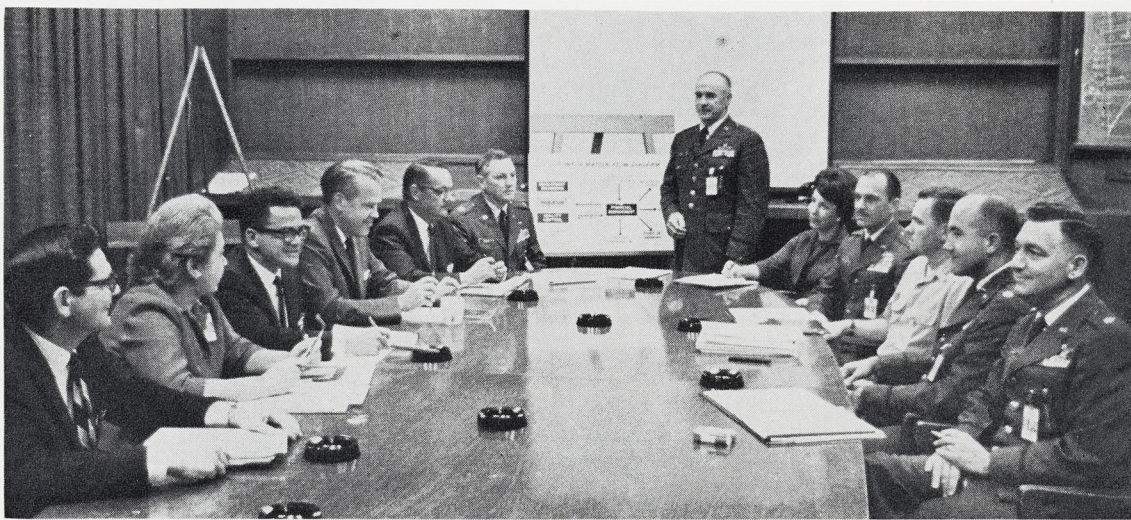
How AFPRO Helps Company Meet Its Military Contracts

Northrop Corporation's Air Force Plant Representative Office relies on the skills of a talented group of men and women in administering government contracts held by Northrop Norair.

Each day this staff of specialists is in direct contact with Norair counterparts on all levels. This teamwork helps assure the delivery of quality products in a timely manner within costs established by contractual terms.

Elsewhere within Northrop Corporation's West Coast operations, other governmental agencies carry out a similar role.

Defense Contract Administration Services District offices at Anaheim and Van Nuys are responsible for the administration of government contracts being filled at Northrop Nortronics and Northrop Ventura, respectively.



Lieutenant Colonel Rufus K. Keeling stands at head of table where key members of the Northrop AFPRO are gathered. They are (left to right) Josh Treiman, Lucille King, Harry Orlow, Robert Coe, Jess Dennis, Lt. Colonel W. O. Ruddock, Bonnie Buckles, Major Robert Walker, Captain W. Houchin, Major D. L. Pascoe and Major H. D. Clarke.



Verification of Northrop Norair inspection is a major activity of the AFPRO staff. Carried out on a random selection basis, verification touches all production phases. Here Norair Inspector R. S. DeArmond (left) confers with J. K. Krogstad of the AFPRO Quality Assurance staff.



Keeping tabs on the hundreds of government-owned pieces of equipment employed by Norair is another key function of the AFPRO. Jim Gnotta (left in center picture) and Myer Miller check papers on a numerically controlled drill, one of 33 machines valued in excess of \$50,000 used by Norair. A newer function of AFPRO is industrial management evaluation with aspects shown in presentation charts held by Marvin Sackett (right).



The men above, representing a majority of AFPRO functions, will have responsibility for evaluating all Norair proposals involving the F-5 and T-38 programs during coming year. They are (left to right) F. L. Harris, R. H. Coe, H. J. Orlow, R. J. Wellman and Larry Bartlett.



The AFPRO Development Engineering Division works closely in helping Norair carry out contracts of a developmental or research nature. Major H. D. Clarke (left) and Larry Bartlett (right) confer with Norair's J. A. Petzold before static test stand.



Last stop for Norair-built aircraft prior to flight is the Final Assembly line at Palmdale. Two AFPRO Quality Assurance representatives, William Markowitz (left) and Bernard Hirsch, perform final verification routines.



Major D. L. Pascoe, AFPRO head of Safety and Flight Operations, radios control tower for taxi instructions as he prepares to take a T-38 trainer up for the final Air Force verification, flight acceptance, at Palmdale.

Northrop Freedom Fighter Praised By Time Magazine

"So maneuverable is it that pilots claim that 'under 30,000 feet, the F-5 can lick anything that flies—no matter how fast it is'.

So says *Time Magazine's* November 11 edition in a 600-plus word article devoted to Northrop Corporation and the Norair-built F-5.

Accompanying the article was a picture of four 1000-mile-an-hour F-5's, flying in close, side-by-side formation.

"So far," the story said, "some 300 F-5's have been purchased by 15 countries, ranging around the globe from Ethiopia to Canada to South Korea. On the books, Northrop has orders for 800 more, worth a total of \$600 million."

Highly Complimentary

The highly complimentary story called the F-5 "a lot of plane for a price tag of \$900,000—about a third of the cost of the F-4 Phantoms the U.S. is using in Vietnam.

"With a razor-thin wingspan of only 27 feet, the F-5 can carry ordnance, including nuclear bombs, weighing up to half of its own six and one-half

ton weight. That makes it, pound for pound, just about the biggest payload carrier of any supersonic plane.

The plane was built to meet the request of Thomas V. Jones, Northrop president and chairman, "for a supersonic jet that can survive and win in a sky full of MIGs."

Sales \$359 Million

The magazine said that Northrop's fiscal sales in 1965-66 were \$359 million, nearly half of that amount in aircraft.

Belgium and The Netherlands are the most recent Free World nations to purchase F-5's.

Canada is building its own version, the CF-5, under license to Norair. Ethiopia, Norway, Greece, Spain, the Republic of Korea, Turkey, the Republic of China and the Philippines are among others employing the F-5.

The plane was first used by American forces in Vietnam in October 1965 as part of Operation Skoshi Tiger, an intensive evaluation.

Following the successful evaluation, the F-5's were turned over to the Air Force's 10th Fighter Command Squadron.

Col. Ruddock New Deputy For AFPRO

Lt. Colonel William O. Ruddock has assumed duties as deputy commander of the Air Force Plant Representative Office for Northrop Corporation.

Prior to his new assignment, Colonel Ruddock was assigned to the Boeing Wichita AFPRO for four years. He served as chief of Electronics Systems for three years and as Air Force Plant Representative at Beech Aircraft Corporation for nine months.



Colonel Ruddock was born in North Carolina. He is a graduate of Clemson University. He has completed advanced studies at Texas A&M University. Entering the Air Force in 1943 via the Aviation Cadet Program, Colonel Ruddock was commissioned in 1944. He has logged more than 5600 flying hours in bombers, including 2200 in jet bombers. He completed two combat tours, one during World War II in B-17's and the other during the Korean Conflict in B-29's. He left the Air Force in 1946 to attend college, but was recalled in 1950 and has served continuously since that time.

NRC To Host Children At Yule Show

Personal invitations to NRC's gigantic Children's Christmas Show were distributed today with the paychecks of all Northrop Corporation personnel in the Hawthorne area.

This show, the "big" event of the year for the younger generation, has traditionally been a favorite of parents, too.

It is scheduled this year for the Hollywood Palladium on December 17. Show times will be at 10 a.m., noon and 2 p.m.

Santa Claus will make his traditional appearance and present an outstanding array of performers.

"Mr. Patch" and clowns galore will be on hand, along with Manny Brown's Orchestra, the Carlson Jugglers, Captain Ross King and his Poodlaire, the acrobatic Lyons Family, and Claudet, the Magician.

Invitations this year are in a special form. They ask each employee to specify how many guests he will bring. Upon receipt of this information, NRC will dispatch sufficient tickets for the family to a specific show, plus a free privileged parking ticket at the Palladium lot.

Here's a word of caution: admission will be by ticket only, so return those reservation forms immediately. Be sure they are posted well in advance of the December 5 deadline.

(Editor's note: This show is being presented for all Northrop Norair employees and their families, plus Nortronics employees at Hawthorne and Palos Verdes. Nortronics Anaheim will hold its annual children's party December 18 at NRC Clubhouse, Fullerton. Information on this event will be forthcoming soon.)

Norair Secretary's Memory Lives On As Employees Help Minister Earn Degree

A man who will soon become a Presbyterian minister will never forget the help given him by a woman he never met.

He is Gary Smith, a student at the San Anselmo Theological Seminary, near San Francisco, and she was Mrs. May Johnstone, a Northrop Norair secretary for 17 years until her death, last July.

Mr. Smith, a member of the First Presbyterian Church of Inglewood, had been forced to take a full-time job to maintain his theological studies and still provide for his wife, son and daughter.

Mrs. Johnstone, a member of the same church, heard of Mr. Smith's problem and decided to help.

Through a bulletin from the church, Mrs. Johnstone heard of a scholarship fund to assist Mr. Smith through his final year of studies (he'll graduate next spring), but she died before the fund drive began.

Continue Fund

As a memorial to Mrs. Johnstone, other Norair employees continued the scholarship fund and sent their contributions to Mr. Smith, an Air Force veteran. The contribution from this fund was \$163.

Because of that contribution and others from members of the church, the future minister was able to resign his job and concentrate exclusively on his studies.

In a letter written to Mrs. Johnstone's friends at Norair, he expressed "astonishment, gratitude and humility over the generous contribution."

"These are more than random words," the letter said. "They do in fact signify special meaning for me.

"Astonishment — because I did not know May Johnstone at all, and I certainly was not aware that she concerned herself with our welfare.

"Gratitude — because of the concrete financial assistance this gift represents. To be surprised by a check which covers 20 percent of my rent this final year really



FUTURE MINISTER Gary Smith was able to resign a full-time job and concentrate on his studies, partially because of a contribution sent to him from Northrop Norair employees as a memorial to Mrs. May Johnstone, who died in July. Shortly before her death, Mrs. Johnstone had expressed her intent to help him. With Mr. Smith are his wife, Diane; daughter, Rhonda, 10; and son, Scott, 8.

eases the economic strain which plagues a family man's study.

"Humility — above all — because every gift humbles one, and the many gifts which poured in recently compound this feeling.

"All I can do in return is resolve to intensify my study and my commitment to the people of God's world, so that my ministry may somehow justify May Johnstone's confidence and your generosity."

Mrs. Johnstone joined Northrop on May 20, 1949. At the time of her death, she was a secretary in Data Processing.

Northrop Symphonaires Book Three Concerts

Three engagements have been booked by the Northrop Symphonaires for the coming holiday season.

The choral group sings for the Norair Management Club, December 1; the NRC Council, December 10 and takes part in the annual Centinela Valley Fine Arts Music Festival December 20.



NEW NORTRONICS PALOS VERDES-HAWTHORNE NRC officers. (L. to R.) Richard Paramore, president; Maury Shulman, vice president; Dorothy Baldwin, secretary; Jeanne Andrecht, treasurer and Danny Gravlin, sergeant-at-arms.



NEW NORAIR NRC OFFICERS—(L. to R.) Jim McKanna, new president; Dick Cade, incoming vice president; Dorothy Wall's, secretary; Bill Lewis, treasurer and Fred Griffin, sergeant-at-arms.



KEYNOTER FOR PILOT-TRAINEES—Dan Darnell, jr., manager of Norair Customer Relations, was a recent guest speaker at the October 21 graduation ceremonies for pilots at Webb Air Force Base, Texas. He is shown here with Air Force officers at the base. (L. to R.) Colonel George E. Franks, air base group commander; Colonel Michael W. Shareck, jr., commander, 331st Fighter Interceptor Squadron; Darnell, Colonel Chester J. Butcher, wing commander, and Lt. Colonel Mount E. Frantz, commander, 3560th USAF Hospital.



ALVINO REY will be the feature entertainer at the all-Northrop Holiday dance on November 26 at the International Hotel, Los Angeles.

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

Wanted to Buy

Pups, miniature Dachshund, AKC champ. stock, 2 black males, 1 red female, males, \$60; female, \$70. Torrance, DA 5-7806. A

Trailer, 1-wheel, spare tire & tube, \$40. Los Alamitos, GE 1-0843. A

Dishwasher, GE portable, used less than 1 yr., \$115. Torrance, 326-6195. A

Ford, 1959, V-8, recent major tune up, \$300. Harbor City, DA 6-2907. A

Acreage, 5 acres near Willow Springs, on good road, low dn. & low monthly pymts. incl. 6% interest, \$2975. Torrance, FR 8-1026. A

Falcon Ranchero, 1963, r/h, 6 cyl., auto., \$699.50. Burbank, 846-1016. A

Thimblebrome Racers, Cox, 3 ea. w/gas engines & misc. parts, \$10. Huntington Bch., 714-847-2648. A

Watch, gold, 18 carat Movado, second hand, day of week, date & month dials, \$20. Marina Del Rey, 823-2655. A

Executive Desk, walnut, large size & desk lamp, \$110. Hawthorne, OS 5-8091. A

TR 4A, 1966, racing green, wire wheels, Pirellis, \$2350. Manhattan Bch., 374-0940. A

Dinette Set, oval white Formica table top, teak legs, Danish modern, 4 chairs, \$18. L.A., 474-0814. A

Lamp Table, Duncan Phyfe, mahogany, \$12. Gardena, OS 5-5258. A

Pontiac, 2-dr. sedan, Grand Prix, extras, \$1395. Box 2301. A

Carpet, 9x12 beige-ivory tweed, 100% Nylon pile, cost \$65; \$30. Torrance, 326-5731. A

H. O. Trains, w/supplies & cab control or larger than normal layout, run trains from 3 different locations, lots of equipment, \$100. Lawndale, 371-7311. A

Cabin Cruiser, 28' x 9' beam, 115 h.p. Chrysler Crown, plank hull, galley, sleeps 4, helm in cabin, \$1200. Long Bch., WH 4-1406. A

Train, Lionel elec., freight & pass. cars, switches, extras, \$95. Hawthorne, OS 6-3886. A

Positraction, rear end 4:56, fits late models Plymouth & Dodge, \$90. Inglewood, 671-2959. A

Porta-Crib, \$10. Torrance, 325-2730. A

Accordion, Contello 120-bass, 3 switches, carrying case, \$75. Manhattan Bch., 379-5366. A

Home, 3-bdrm., ocean view, 4 blocks to King Harbor, near schools & shop., interior completely redecorated, 40x120 lot, \$22,000. Manhattan Bch., 374-4223. A

Dining Room Set, Virtue Bros., 6 chairs, 2 exts., beige & gold, Nev-A-Mar top, \$50. Hawthorne, 676-1441. A

Oldsmobile, 1961 Holiday cpe., r/h, w/s Premium tires, p/s, p/b, \$1025. Fullerton, 714-528-8582. A

Recorder, tape & dictating, solid-state transistorized w/carrying case, foot control, & earphone kit, \$139. Hawthorne, 679-5436. A

Volkswagen, 1966 sunroof, 1300 cc, 13,000 miles, \$1895. Hawthorne, 679-7662. A

House, 3-bdrm. & beam-ceiling den, 2-car detached gar., fenced play yard, near fwy. & schools, loan avail., consider low down, \$21,900. Gardena, DA 9-2904. A

Enlarger, 4x5, Federal, drier & all dark room equip. incld., \$50. Lynwood, NE 5-3294. A

Sofa, & chair, \$25. Hawthorne, 676-3883. A

Accordion, Contello, w/case, orig. cost \$395; \$150. Gardena, 329-9484. A

Infant Seat, \$4. Westminster, 897-2161. A

Motorcycle, Ducati Scrambler, 1965, stripped for dirt, eng. o/hailed, extra sprockets, hvy. suspension, misc. extras, \$400. Hawthorne, OS 5-4239. A

Barracuda, 1966, radio, p/s, auto. trans., V-8, console, 8000 miles, \$2590. L.A., 837-4596. A

Dodge, 1955 2-dr. V-8, r/h, auto. trans., \$100. P.V., FR 7-4317. A

Lot, large, o/looking ocean, \$1000 dn. or more at option of buyer, owner will carry bal. at 6.25%, \$12,500. Rolling Hills Ests., 377-0146. A

Jig Saw, 18" w/stand & motor, \$20. P.V. Pen., 377-9842. A

Mercury, 1962, convt., custom Monterey, p/s, p/b, p/w, new tires, 1-owner, 32,000 miles, \$850. L.A., 476-3418. A

Tape Recorder, stereo & microphone, Phillips, 4-track, 4-spds., 7" reels, \$125. Huntington Bch., 962-6429. A

Honda, 1964, 55 sport, \$225. Hawthorne, 676-3142. A

Chest-of-Drawers, bookcase & chair, \$50. Hawthorne, 675-7965. A

Electronic Equipment, Eico VTVM, model 221 & Heath oscilloscope, model 0-5 w/extended range, \$50 or sell sep. Torrance, DA 6-8273. A

Pontiac, 1965 GTO, 389 eng., air cond., p/w, p/s, auto., many other extras, 25,000 mi., orig. owner, \$2500. Norwalk, 868-7402. A

Guitar Amplifier, Gibson Titan 3, orig. cost, \$695; \$350. P.V. Pen., 377-7670. A

Bar Stools, 2 Danish modern, \$15. Gardena, 635-3127. A

Mobile Home, 1964 Universal, extended living & dining rm., unfurn., 1-bdrm., porch & awning, skirts, evaporative cooler, w/w carpet, in East Anaheim, \$5695. Anaheim, 533-3649, 772-5754. A

Radio Transmitter, amateur, Heathkit DX100, \$55. Hawthorne, OS 6-6949. A

Lot, 75' frontage on Palo Verde lagoon by 136' deep at Palo Verde, Calif., \$9000. Gardena, 213-324-1566. A

For Sale

Stereo, Hi-Fi components, AF/FM tuner, dual amplifiers, dual preamps, dual cross-overs, 4 speakers, stereo turntable, \$74. Hawthorne, 799-9476. A

Range, O'Keefe & Merritt, gas, \$35. Torrance, 329-9021. A

Aircraft Batteries, rebuilt, new guarantee, \$20 & up. L.A., 755-8018. A

Home, 2-bdrm., w/15 x 30 swimming pool, 2-car gar., fireplace, garb. disp., new cpts., 4 terraces, lge. lot, will carry second, \$26,000. El Segundo, EA 2-6595. A

MG-TD, 1953, all rebuilt, new upholstery, top, tires & paint, \$1100. Harbor City, 534-0383. A

TV, 1960 Zenith 21", tuner needs repair or replacement, \$30. Hawthorne, OS 5-5574. A

Tricycle, Murray 16", ball bearing wheels, \$9. Torrance, DA 9-2016. A

Dishwasher, General Electric convt., front load type, still under warranty, \$170. Yorba Linda, 528-9227. A

Desk, maple, \$50. Hawthorne, OS 5-6331. A

Rambler, 1963, Amb., V-8, AM/FM radio, p/s, p/b, o.d., b/s, console, \$995. L.A., 475-1497. A

Movie Projector, Bell & Howell, 8mm, \$50. Inglewood, OR 1-2429. A

Oldsmobile, 1964, F-85 station wagon, p/s, p/b, p/rear window, auto. trans., factory air, 2 new tires, \$1575. Inglewood, PL 4-7861. A

Power Mower, King O'Lawn, front throw, 18" \$75. Gardena, 327-1683. A

Dress Form, size 12, short waisted, unadjustable, \$5. Torrance, 329-6748. A

Movie Camera, 8mm Mansfield Holiday auto. zoom lens, pistol grip, leather case & tripod, used 3 times, \$60. Lynwood, 638-3423. A

Living Room Furniture, couch, matching chair, contrasting tub chair, coffee table, 2, 3-tiered used 7 mos., \$280. Gardena, 327-5825. A

Camper, 8' Camp-A-Long, 3-burner butane stove, ice box, water tank, sleeps 2, \$500. Los Alamitos, OS 6-7122. A

Cemetery Lots, in Inglewood Park cemetery, \$9.8. Redondo Bch., FR 8-9741. A

Transmission, Chev. Powerglide, \$50. Hawthorne, 679-5371. A

Pontiac, 1937, cpe., orig. cond., \$225. Hawthorne, 676-9933. A

Condominium, 4-bdrm., 2½ baths, fireplace, elec. kitchen w/bltins, cpts., dps., swim pool, putting green, rec. hall, owner will finance 6¼% or lease \$225 mo., \$31,500. Torrance, 324-6137. A

Thunderbird, 1959, \$500. Hawthorne, OS 9-6215. A

House, 3-bdrm., 2-bath, 20' x 16' covered patio, new cpts. & dps., in Torrance, 5¼% FHA mortgage, \$141 mo. pymts., \$25,500. P.V. Pen., 377-9666. A

Sofa-Bed, Riviera, dble. bed size, black & white tweed, \$50. Gardena, 321-2848. A

Relax-A-Cizer, elite model, has hip, abdomen, & facial attachments, used 5 times, \$65. Compton, 774-1778. A

Radial Arm Saw, complete, Craftsman, 10", color coded controls, lge. 20% x 40" table develops 2 h.p., auto. friction lock holds carriage, electro-magnetic brake, \$135. Torrance, FR 1-1365. A

Home, 4-bdrm., 2-bath, family rm., 2 yrs. old, 5½% loan on first t.d., 1 mile from Research Park, \$37,900. P.V. Pen., 377-5172. A

Wedding & Engagement Rings, white-gold diamond, orig. cost \$700; \$350. Hawthorne, 679-2456. A

Honda S-90, 1-yr.-old, 100 mpg, dual mirrors, luggage rack, helmet, tool kit, cost \$450; \$325. San Pedro, TE 3-4272. A

Girl Scout Uniforms, 2, sizes 8 & 10, incl. dress, beret, belt, tie, & banner, each worn 3 times, \$5 ea. Gardena, 329-9248. A

Honda, C-110, 5 h.p., black & chrome, \$195. Buena Pk., TA 8-2815. A

Piano, \$50, other misc. items & clothing, Torrance, 370-2794. A

Ford, 1955, 2-dr., stick shift, r/h, new seat covers, battery, tires & shocks, \$235. Port. Bend, 377-3482. A

El Camino, 1965, 327 cu. in., 300 h.p. 4-sp. trans., p/s, new tires, \$2250. Hawthorne, 679-9312. A

Reducing Couch, elec. motor, deluxe, 3-sections for easy storage, sandbag weight, \$50. Van Nuys, 213-344-6948. A

Camper, home-built, for ½-ton short bed, 4 bunks w/foam rubber pads, fully insulated, \$100. Welteria, FR 8-6354. A

Ski Boat, 14½' Performer, refinished inside & out, 70 h.p. Merc. motor, full elec., new tires & tubes on trailer, all equipment, \$650. Palmdale, 805-947-3476. A

Thunderbird, 1962, coupe, factory air cond., power windows, 58,000 miles, \$1500. Ventura, 805-643-3566. A

De Soto, 1956 4-dr. h/top, big Hemi-head eng., 4-bbl. carb, needs timing chain, \$95. Anaheim, 774-2779. A

Washing Machine, 1956, Whirlpool Imperial MK VII, 1 year since o/haul, needs trans. work, \$15. Gardena, FA 1-1655. A

Thunderbird, 1962, orig. owner, low mileage, air cond., new custom tires, \$1650. Inglewood, PL 6-3950. A

Corvette, 1962, 327 eng. 340 h.p., 4-sp., positraction, removable h/top, \$2000. Hawthorne, 322-2544. A

Dodge Coronet, 1965, 500, V-8, auto., 26,000 miles, \$1850. Torrance, 371-2389. A

For Sale

Surfboard, Greg Noll, 9'3", \$45. Inglewood, PL 6-7681. A

Adding Machine, Burroughs 10-key elec., subtracts & multiplies, recent model, \$85. L.A., GR 2-3023. A

Pickup Trailer, all metal, 3½' W x 5' L x 1' D, \$60. L.A., 670-4557. A

Bicycle, boy's 20" Sting Ray-type, \$18. Gardena, DA 9-4675. A

Volkswagen, 1965 sedan, r/h, good tires, serviced regularly, s/belts, \$1350. Anaheim, 635-2187. A

Beach Home, ½ block to ocean, lge. lot, 2-bath, modern kitchen, 2½ gar., lge. patio, small down, immed. occupancy, \$37,500. Hawthorne, FR 9-3353. A

House, 1½ miles to Northrop Ventura, 3-bdrm., 1¼ bath, family rm., dps., shutters, cpts., patio, fully landscaped, sprinklers, custom features, 10% down, \$22,000. Newbury Pk., 805-498-3043. A

Sprite, 1962, r/h, w/s/w, t.c., 1-owner, \$799. P.V. Ests., 375-6971. A

Organ, Lowrey spinet, maple, w/chimes, percussion & Hawaiian guitar features, \$595. Torrance, 323-6717. A

Scooter, Allstate compact, \$150. Inglewood, 672-3147. A

Wedding Dress, traditional princess style, white silk taffeta w/train & applique around neckline & 3 petticoats attached, \$60. Rolling Hills, 831-9707. A

Pontiac, 1963 G.P., fac. air, r/h, p/s, p/b, w/s/w tires, alum. wheels, low mileage, \$1995. Huntington Bch., 714-847-0648. A

Organ, Hammond M-3 spinet w/percussion, unmarred maple finish, \$750. San Pedro, 831-5837. A

Light Plant, homemade, 6-V bat., '54 Chevy gen. & voltage reg. & ammeter, ¾ h.p. Briggs & Stratton motor, \$25. Torrance, 328-1076. A

Pups, airedale, champion stock, \$125. Hawthorne, 698-2785. A

House, 4-bdrm., family rm., 2½ baths, 1 acre, horses ok, near Northrop Ventura, \$35,000. Somis, 805-482-1186. A

Chevrolet, 1957 Nomad, p/s, p/b & p/w, air cond., 283 cu. in. eng., \$950. Hawthorne, OS 9-8687. A

Corvair Monza, 1964 convt., r/h, p/operated top, safety padded dash, 110 h.p., twin carbs., 4-spd. shift, w/s/w tires, low miles, \$1200. San Pedro, 831-5283. A

House Car, Metro truck w/Jeep eng., complete w/cpts., stove, w/oven, 10-gal. water tank, 8.5 gal. but. tank, 2 beds, each sleeps 2, 1 single bed, \$900. Torrance, 328-7234. A

Chevrolet, 1957 Bel Air h/top, new rebt. 301, dual quads, Chevy fuel injection cam, b/seats, 3-spd. stick, chrome wheels, \$700. Hawthorne, 679-7020. A

Plymouth, 1960, station wagon, p/s, Hydro rear window, 6-cyl., \$533. Redondo Bch., 374-1124. A

Trailer, 15' Field & Stream, gas stove w/oven, elec. brakes, 2 butane tanks, sleeps 5, \$650. Hawthorne, 675-6571. A

Corvair Monza, 1963, 4-spd., radio, new tires, \$800. Inglewood, 673-3503. A

Refrigerator, 12 cu. ft., Coldspot, large freezer across top, \$75. Gardena, 644-1485. A

Cessna, 1966 Commuter, full gyro panel, 360 radio, 3-light mkr. bcn., child seat, approx. 390 hrs. total time, \$7500. Long Bch., FR 8-6951, OS 6-6138. A

Youth Bed, & mattress, \$10. P.V., FR 7-6435. A

Chevrolet, El Camino, 1959, 4-spd., r/h, newly painted & reuphol., good running cond., \$695. Hawthorne, OS 5-7938. A

Corvair Monza, 1963, 4-spd., r/h, 3 near-new tires, \$1105 retail; \$850. La Puente, 330-3667. A

Home, 3-bdrm., full baths, bitin kitchen, forced air heat, detached gar., \$29,950. Hawthorne, 671-6187. A

Sewing Machine, Kenmore portable w/button-hole & other attachments., \$25. Redondo Bch., FR 5-8804. A

Hi-Chair, Cosco, blue plastic covered seat & back, chrome tray & legs, \$7. Rolling Hills Ests., FR 9-9689. A

Corvair Monza, 1964, take over \$58 mo. pymts., \$1080 bal. Box 2302. A

Student Desk, \$20. P.V. Ests., 378-3055. A

Dinette Set, chrome, gray marbelized, ext. leaf, 4 chairs, \$35. Inglewood, PL 4-4052. A

Stenotype, w/case, stand, & 50 pads of paper, \$35. San Pedro, 833-2723. A

Coffee Table, matching end tables, white w/inlaid brass, brass legs, \$50. Torrance, 371-5916. A

Wanted to Buy

Piano, spinet console, must be good condition & very reasonable. Torrance, DA 6-5558. A

Fishing Equipment, salt water & fresh water rods, reels & tackle. Norwalk, 865-6736. B

Microphones, 2, to use w/Roberts stereo tape recorder, prefer directional type. Whittier, OX 3-4117. B

Ford Wagon, 1962 or 1963, no more than 45,000 miles, good condition, cash. Redondo Bch., 378-4654. B

Tenor Saxophone, must be in good condition. Long Bch., GA 3-1363. B

Ham Equipment, 80 thru 10 meter V.F.O., audio compressor, 2-meter converter. Culver City, VE 9-5438. B

Wanted to Buy

Vacuum Tube Voltmeter, reasonable condition & price. Fullerton, 879-1447. B

Dining Room Table, Duncan-Phyfe, drop leaf, w/chairs, mahogany, reasonable. Inglewood, 757-7824 after 10 a.m. B

Old Motorcycles, 1949-1955 Tri., B.M.W., H.D. & Vincents, also 3-wheelers. Hawthorne, 672-1576. B

Chevrolet Shop Manuals, 1963 & 1961. Manhattan Bch., 374-0158. B

Blue Chip stamp books, \$1.50 ea. L.A., 664-6564. B

For Trade

House, 2-bdrm., 4 blks. to Norair, will consider trade \$10,000 equity for free & clear 12' wide mobile home. Hawthorne, OS 9-6982. A

Rentals Offered

Lady to share home, \$50 mo. Redondo Bch., 374-4847. E

Apt, 2-bdrm., unfurn., cpts., dps., closed gar., laundry rm., 1 block from Hermosa Bch., \$110 mo. San Pedro, 831-6789. E

Apt, 2-bdrm., cpts., dps., bltin stove, carport, water pd., \$125. Inglewood, 673-3427. E

Duplexes, 1 & 2-bdrm., furn., 1½ miles from Norair, \$97.50 & up. Inglewood, OR 1-9375. E

Apt, 1-bdrm., gar. water paid, newly redecorated, 1 child ok, avail. Dec. 1, \$75 mo. Hawthorne, 675-4267. E

Vacation Cottages, Idyllwild, 1 & 2 bdrms., fireplace, stream, patios, \$20-\$35. w/ends; \$45-\$70 wk. L.A., PL 4-5288. E

Apt, 1 extra large bdrm., cpts., dps., bltins, gar., water, trash paid, close to Northrop, \$95 mo. Hawthorne, 325-5705. E

Apt, 2-bdrm., 1½ bath, cpts. & dps., bltins, near schools & recreation, \$125 unfurn.; \$155 furn. Inglewood, 644-2565, 672-1890. E

Vacation Cabins, Lake Gregory & Crestline, \$25 w/ends; \$60 wk. Venice, EX 1-2040. E

Apt, 2-bdrm., unfurn., cpts., dps., bltins, carport, disp., forced air, laundry rm., newly painted, water & trash pd., \$110. Hawthorne, OS 9-1851. E

Apt, 1-bdrm., unfurn., all bltins, pvt. deck, lge. pool, ample sub. parking, near Northrop, \$125 mo. Lawndale, 679-2117, 670-6084. E

House, 2-bdrm., fenced yd., water & trash paid, near schools, 2-car gar., \$118 mo. Hawthorne, DA 9-9621. E

Apt, 2-bdrm., unfurn., bltins, cpts., dps., pvt. patio, closed gar., \$125 mo. Torrance, FR 5-0887, 320-7547. E

Cabin, Big Bear Lake, sleeps 7 to 9, \$18 w/end; \$50 wk. Bellflower, TO 7-0652. E

House, Orange County, near S.D. Fwy., 3-bdrm., den, cpts., dps., family rm., bltins, dishwasher, disposal, laundry rm., \$195. Westminster, 714-531-7306. E

Child Care Offered

In my home, hot lunch, lge. fenced rear yard, encl. rumpus rm., planned activities. L.A., PL 4-2784. G

Personals

To those who expressed their sympathy in so many beautiful & thoughtful ways during my recent bereavement, I extend heartfelt thanks. MRS. DARLEEN GUNION. L

We wish to express our deep appreciation to all our friends at Nortronics; especially those of NRC, my division & my dad's division for the beautiful flowers & most welcome collection. BETH ANN & DAVID KELLEY-HOUSE. L

Sportsman Wanted, to share expenses for Mexican safari during Christmas vacation, hunt jaguar, ocelot, alligator, also fishing for marlin at Mazatlan. L.A., HO 3-5337. L

Free storage of spinet or baby grand piano in my home. Garden Grove, 714-539-2262. L

We sincerely thank all of our friends for their kindness & sympathy at the recent passing of our father. MELVINA DENCH, CLAY ENOCH jr. & CARROLL ENOCH. L

Roommate wanted, girl, 21-30 to share w/same, Anaheim area, very reasonable. Box 2304. L

For Sale or Trade

Cabin Cruiser, 27' Chris-Craft, sleeps 4, completely equipped, V-8 power, ship to shore radio, bow rail & swim step, \$5500 or trade small ski-boat. Torrance, DA 9-3900. M

Yamaha, 1964 80 cc, \$250 or trade for pickup. Hawthorne, 679-4237. M

Pontiac, Tempest, 1963, station wagon, r/h, auto. trans., luggage rack, \$895 or trade on Volkswagen, 1966. Manhattan Bch., 372-3878. M

Antique Auto, 1920 Model T Ford, center dr. sedan, fully restored incl. new authentic interior, \$2000 or trade for T-Bird, 1955 or '56. Fullerton, LA 5-9715. M

Home, 5-bdrm., 2½ bath, Spanish style w/paneled bar & den, lge. open beam living rm., covered patio, basement, plus 10 furn. units, 5 2-bdrm. & 5 1-bdrm., has \$77,000 1st T.D., owner will carry 2nd, \$152,000 or trade for property in West L.A. Hollywood, HO 4-1084. M

Train Set, Lionel O gauge, locomotive, cars, track & log loader, \$25 or trade for HO train set. P.V. Pen., 377-5862. M

Pontiac, 1959 Safari wagon, air cond., new tires, battery, brakes, susp. bushings & shocks, \$375 as part trade for revolver, tune-up gauges, or mechanic tools. L.A., 756-1431. M

Chevrolet, 1965 Impala SS, 396 console, b/seats, auto. trans., fac. air, p/s, p/b, 21,000 miles, \$2500 or trade for less plus \$100-\$300 old trans. car. Costa Mesa, 546-5891. M

Rides and Riders

Rides Wanted

7 a.m. — 3:42 p.m.

Avalon & Vernon, Los Angeles. Edwin L. Durham, Norair, ext. 2236, 231-0855.

El Segundo Blvd. & Doty, Hawthorne. Estelle Borger, Nor. Anaheim, ext. 415, 676-8965.

7:30 a.m. — 4:12 p.m.

Manchester & Vermont, Los Angeles. John Curtis, Norair, ext. 1581.

8 a.m. — 4:45 p.m.

Magnolia & Cerritos, Anaheim. Leslie Allen, Norair, ext. 2412, 714-828-2012.

Commonwealth & Lemon, Fullerton. Penny Branch, 879-2524.

Leutweiler & Leffingwell Rd., Whittier. Ernest J. Keraly, Norair, ext. 2563, 944-5946.

Lakewood Blvd. & Imperial Hwy., Downey. Morris Brown, Norair, ext. 2042, TO 1-8508.

Rides Offered

8 a.m. — 4:45 p.m.

Magnolia & Cerritos, Anaheim. Leslie Allen, Norair, ext. 2412, 714-828-2012.

Commonwealth & Lemon, Fullerton. Penny Branch, 879-2524.

Lakewood Blvd. & Imperial Hwy., Downey. Morris Brown, Norair, ext. 2042, TO 1-8508.

Leutweiler & Leffingwell Rd., Whittier. Ernest J. Keraly, Norair, ext. 2563, 944-5946.

NRC To Launch Eight-Week Investment Seminar

Hawthorne area NRC Councils are formulating plans for an investment seminar in the spring covering the broad field of investments.

Last spring 150 persons attended an eight-week seminar sponsored by NRC which covered only real estate investments.

These individuals, and others, have asked NRC to expand the program, to include other investment possibilities.

Just how far the program will go and what it will cover will be left up to the individuals who wish to participate, according to Personnel Activities.

Some of the topics under consideration are planning and guidance, stocks (analyses), mutual funds, commodities, real estate, estate planning, taxes, small businesses, money (system and market), world and national influence, and investment consultants.



PROUD MOMENT in the life of Robert W. Young (left) of Northrop Ventura as his 25-year pin is presented by George F. Douglas, Corporate vice president and Ventura general manager. Mr. Young is manager of Quality Control. He joined Northrop on October 2, 1941.

Robert Young Is Awarded 25-Year Pin

Robert W. Young, head Quality Control at Northrop Ventura, has become a 25-year man for Northrop Corporation.

Mr. Young joined the firm on October 2, 1941, and remained at Norair until April of 1956, when he went to Ventura.

Mr. Young was one of 19 Ventura employees to qualify for service pins in October. Three became eligible for 15-year pins; 11, for 10-year pins; and four, for five-year pins.

Mr. Young, who lives in Encino with his wife, Norma, attended Venice High School in Los Angeles, and Santa Monica City College, before joining Northrop. The Youngs have a 23-year-old daughter, a graduate of San Fernando Valley State College, in Northridge.

Mr. Young received his pin from George F. Douglas, Corporate vice president and Ventura general manager.

Fifteen-year pin recipients for October were Glyn Blythe, Clyde Dawson and R. Gordon Reeder. Ten-year employees were:

Theodore Bennett, Stanley Boyle, Wilhelmina Carr, Placido Duran, Morris Fischel, George Gaudry, Joyce Nelson, Larry Parson, Donald Pitts, Leslie Stewart and Russell Thomas.

TRAINING

(Continued from page 1)

This, Boeing officials have said, "is a specialized program of adapting a product to each individual customer."

Ventura personnel at the week-long planning meeting were:

John Schaeffer, Irv Podemski, John R. Krieger, Harry Caseldine, James Travers, Chester Haynoski, Martin Zeller, Jack Fisher, Guy Scott, William Quick, Ken Jackson, John Beaudoin and Tony Fortuna.

Attending the Omnibus Concept meeting were:

L. B. Carroll (Ventura 747 Program Manager), Enos W. Jeffs, Wayne Beeman, John Lawrence, Robert Provart, J. M. Bross, Mr. Fortuna, Robert Pemberton, John Lind, Harry Morgan, Lou Fisher, James Goff, Max Thieme, Bernard Barnes, and Leslie Hudson.

Instructors are Scott Burke and Al Henschel, Norair engineers, and Jerrold Lentz, of Norair Personnel Development and Training. The three received training at Boeing facilities in Renton, Washington, for leading instructional programs.

Ventura will supply fiberglass wing fairings for the 747 which Boeing hopes to begin producing by 1968, with deliveries starting in 1969.

Norair has a contract for designing and building the major portion of the fuselage.

Camera Club Offers Tips to Beginners, Advanced Members

Members of the Northrop Ventura Camera Club like to think of their group as a haven for every camera owner — from Hawkeye to Hasselblad.

"We have some members who are beginning, and others who are very advanced," Club Commissioner Dan Cashier said.

"We often have several activities going on at the same time at a meeting, so each member can choose the subject which interests him most."

An example was the club's November meeting, at which Curly Martin, Ventura photo lab chief, and two of his photographers, Bob Thornton and Gil Nunn, offered instruction to members.

Proper Lighting

"We had one group learning about proper lighting," Mr. Cashier said, "while another was working on the enlarger, and the third was developing film."

The group met in Mr. Cashier's home in Thousand Oaks, where he has installed a photo lab, including an enlarger capable of accommodating film sizes from 35 millimeter to 2 1/4 by 3 1/4 inches.

At the next meeting, to be held at 6:30 p.m., December 5 in the Ventura cafeteria, the group will have a portrait-taking session.

Membership is open to Ventura employees, their wives or husbands, and children. Further information may be obtained by calling Mr. Cashier at ext. 373 or Eileen Munro at ext. 327.

RICHARDSON

(Continued from page 1)

Corporation personnel, which has been most satisfactory.

"Larry has been providing services in an efficient manner which has resulted in no loss-time periods in his area of responsibility. He has extended himself by arrangements and re-arrangements of vacations as well as prolonged work periods in the interest of assuring that the tasks were performed in a timely manner."

"On behalf of McDonnell, I commend Larry on his accomplishments during his association with our organization."

McDonnell was prime contractor for the Gemini program.

Mr. Richardson has a master rigger's license to go with his training.

"I don't have any qualms about a mission when it becomes time for chute deployment," he said. "We ran tests for more than two years, and we trained hard for this, so we're confident things will work as planned."

Actually, Ventura supplies five parachutes for every Gemini flight—and Mr. Richardson is in charge of packing all of them.

GEMINI 12

(Continued from page 1)

orbited 11 cosmonauts in its eight successful manned flights.

Ventura's responsibilities in providing the landing systems has increased, just as the weight of the spacecrafts has risen.

The main parachute for the single-piloted Mercury capsule was a 63-foot Ringsail. The Gemini utilized an 84-foot Ringsail, and the Apollo capsule will float beneath a cluster of three Ringsails, each with a canopy diameter of 83.5 feet.



SPARKING A CORPORATE-WIDE news plan, NRC commissioners and publicity chairmen met in downtown Los Angeles to consider a plan to make certain that Northrop people know what is taking place in their favorite activity. (L. to R.) Bob Benedict and Anne Thomas, Nortronics Anaheim; Jack Sheridan and Ben Sumner, Northrop Ventura; and Bill Wareing, Northrop Norair. Some of the commissioners present were not in photo.

Lee Bradley Sets Fast Suggestion Award Pace

Plastics fabricator Lee R. Bradley of Northrop Ventura is a man with ideas.

Four of his ideas have paid off in recent weeks, bringing him suggestion awards totaling \$55.

In all, Ventura employees have received \$115 for suggestions in the past few months. The announcement was made by Johnnie Via, suggestion award coordinator.

Mr. Bradley's suggestions brought about significant time savings. One involved the manufacture of camera housings.

"At present, we are using two men to apply long strips of material to the part," Mr. Bradley wrote.

"This takes approximately two man-hours.

"What I suggest is that we use a roller attached over a mandrel to apply the strips. The roller should be 4 inches in diameter and 14 inches in length."

Accompanying his suggestion was a detailed sketch.

Mr. Bradley submitted the suggestion to supervisor Ray Burdette, who reviewed it and gave it to Andy Andrews, Manufacturing supervisor.

"The roller was installed above the mandrel on the lathe," Mr. Andrews later wrote in a report, "and it works very well."

"Since it has been in operation, there has been an actual savings of 42 minutes, or .7 man-hours per housing."

It was computed that use of the roller on the 110 housings remaining in the contract would result in a total time saving of 77 hours.

Other employees with winning suggestions were:

Thomas Hunter, Ann Pinkerton, S. M. DiPasquale, G. R. Johnson, jr., and Charles Kennedy.

ROUNDTABLE

(Continued from page 1)

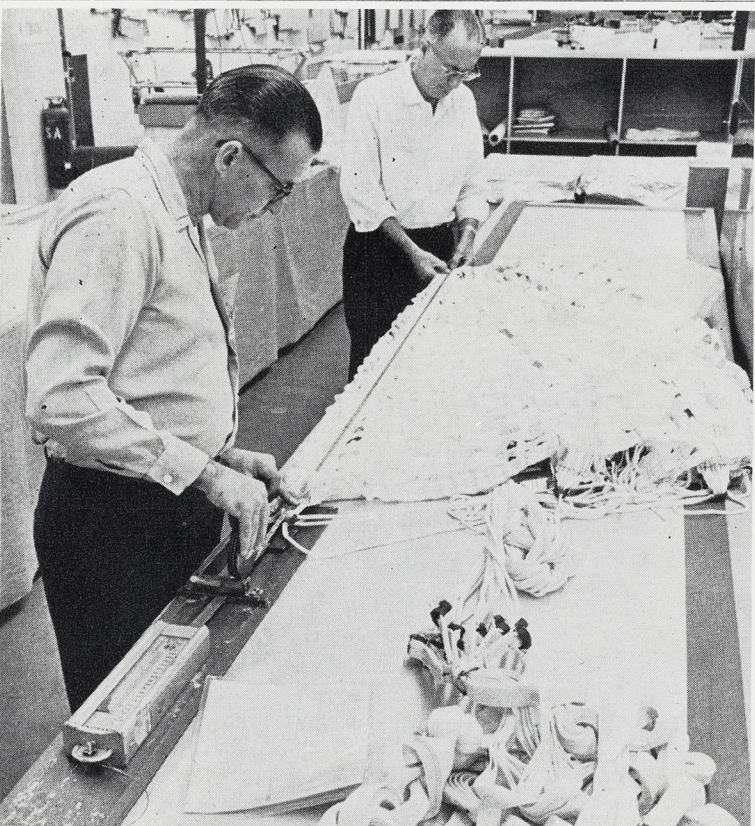
of Los Angeles, Management Technology Incorporated. Their topic was "Simulation and Organization."

Among the Southern California organizations represented were North American Aviation, Douglas Aircraft Company Aerospace Corporation, Ling-Temco-Vought, General Dynamics, Lockheed Aircraft Corporation, TRW Systems, Aeronutronic Division of Philco Corporation, and Hughes Aircraft Company.

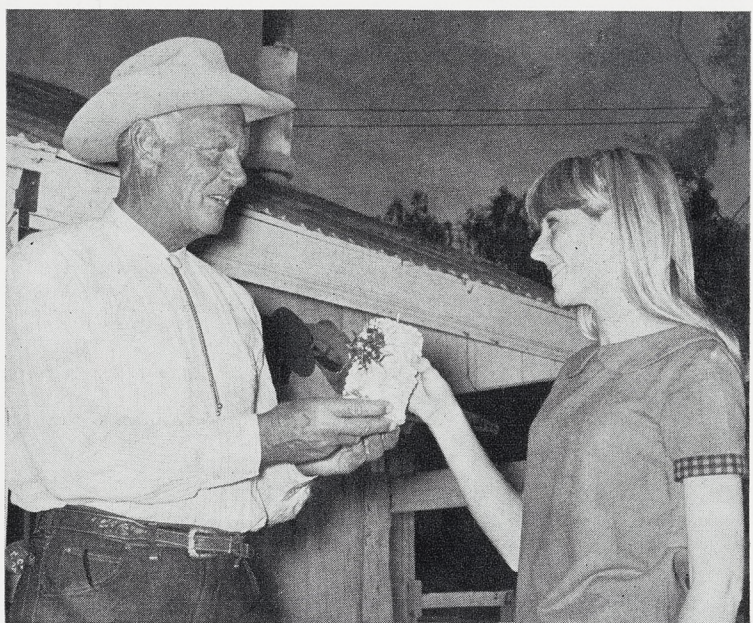
"Our interest," Mr. Merlian said, "is in getting away from the pure academic approach of solving problems at a meeting. Because of the limited membership, we are able to stimulate group participation and present concepts on a professional level."

"The advancement of the state of the art in management technologies is our principal interest."

The all-day meeting was held in Ventura's Assembly room.



CUTTING AND SEWING are two of the precise operations necessary in the manufacture of this Gemini Ringsail parachute. Every measurement is double-checked, assuring that exact size requirements are met. This is part of the operation of the Northrop Ventura Parolab, where chutes have been made for the Mercury, Gemini and Apollo programs.



ACTOR JOEL MCCREARY, a Ventura County resident, buys a Christmas candle from Toni McArthur, secretary of MINIKO, a Junior Achievement company. The company, counseled by Northrop Ventura officials, is the only one in the county.

NORTHROP NEWS

NORTHROP VENTURA

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Crew Named For First Apollo Trip

Virgil Grissom, Edward White and Roger Chaffee will be the crew on the first manned flight of the Apollo spacecraft, scheduled for early next year by the National Aeronautics and Space Administration (NASA).

Mr. Grissom, a veteran of the Mercury and Gemini programs, will be command pilot. Mr. White, command pilot on the Gemini 4, will be senior pilot.

Mr. Chaffee, making his first orbital venture, will hold the title of pilot.

All Apollo missions will return to earth beneath parachute landing systems designed and built by Northrop Ventura, which has provided the landing systems for all 16 previous U. S. manned flights.

In keeping with their policy of not announcing an exact target date until shortly before launch time, NASA officials have said the first Apollo flight will take place in the first quarter of 1967.

Originally, the mission had been scheduled for launch late this year, but it was later postponed.

NASA has christened the first manned Apollo flight the A/S 204. It will be powered by an up-rated Saturn I booster, the same rocket which sent an unmanned Apollo capsule on a three-quarters orbital flight in August.

Later Apollo flights, including the first manned mission to the moon, will be powered by the larger Saturn V.

Ventura's landing system for the Apollo consists of three 83.5-foot Ringsail parachutes, which are released by an automatic sequence controller, using drogue and pilot parachutes. Mercury and Gemini missions used only one main parachute.

Students Tour Photo Lab

Five members of a University of California Extension class in industrial arts have toured Northrop Ventura's Photo Lab and Graphic Arts facilities in a visit arranged by Ventura school officials.

(See TOUR, page 6)

NORTHROP REPORTS BIG BACKLOG HIKE IN FIRST QUARTER

Northrop Corporation had first quarter earnings of 60 cents per share on 4,211,187 shares outstanding at October 31, 1966, a 46 percent increase over the 41 cents per share earned on 4,160,636 shares outstanding a year earlier, Thomas V. Jones, president, has reported. The total earnings for the first quarter of fiscal year 1967 amounted to \$2,527,000 compared with \$1,691,000 for the same period a year ago.

Sales for the quarter totaled \$102,005,000 compared with \$70,563,000 a year ago.

"As a result of growth mainly in aircraft, communications systems and advanced weaponry, we expect total sales for the current fiscal year to approach the \$450,000,000 level," Mr. Jones stated. "We expect earnings this year to be higher than last year despite the fact that we are doing considerable work that will not be reflected in sales or earnings for another year or two," he said. Northrop sales for fiscal 1966 totaled approximately \$359,000,000.

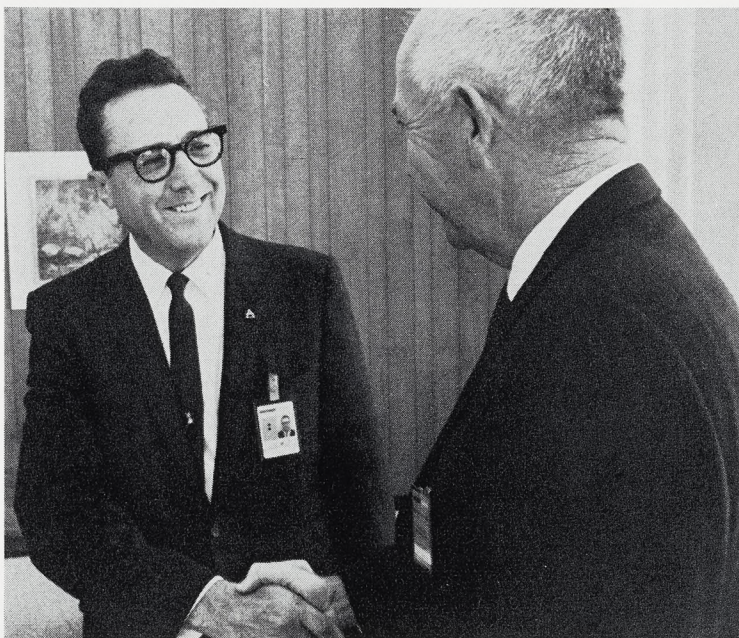
"Our backlog of orders at October 31 amounted to \$557,000,000 and is well diversified as to product area," Mr. Jones said. Backlog a year ago totaled \$285,000,000.

"We expect the F-5 Freedom Fighter to continue to make important contributions to sales and earnings as other allied nations select the airplane," Mr. Jones said.

"On the Boeing 747 program, we are in the midst of the tooling, engineering and development phases. This program is scheduled to contribute significantly to sales beginning in fiscal 1969. We currently expect about \$500,000,000 in business on this program, but only \$111,000,000 of this is included in the company's backlog figure," Mr. Jones stated.

Dividend Declared

The board of directors of Northrop has declared a quarterly dividend of 25 cents per share, payable December 17 to stock of record December 2.



SINCE 1941, Fred Wegelin (left) has been employed by Northrop Corporation. Here, he receives his 25-year pin from George F. Douglas, Corporate vice president and Ventura general manager. Mr. Wegelin is associate project administrator of the RP-76 Operations group.

RP-76 Man Earns Award For Service

Fred Wegelin, associate project administrator of Northrop Ventura's RP-76 Operations group, has received a service award for a Northrop career which began at Norair in 1941.

Mr. Wegelin was presented his 25-year pin by George F. Douglas, Corporate vice president and Ventura general manager. He was one of 11 Ventura employees who received a service award last month.

Mr. Wegelin began his career at Norair in subassembly production, later became a field service crew chief, and, from 1952 through 1956, was foreman of missile services for Northrop at Patrick Air Force Base, in Florida. In 1956, he was promoted to general foreman, Research and Development at Patrick AFB.

In 1959, he was transferred to Northrop Ventura, and was manufacturing superintendent in test and repair at the McGregor Guided Missile Range in El Paso, Texas.

Having spent 16 years in the field, Mr. Wegelin returned to Northrop Ventura in 1963 where he spent the succeeding years as a Quality Control engineer and was chairman of Ventura's Corrective Action Team, an organization established by Quality Control.

Mr. Wegelin has held his current position since 1965 and finds working with field projects both interesting and challenging.

"I spent 16 years in the field for Northrop," Mr. Wegelin said, "and thoroughly enjoyed every bit of it."

Other Venturans receiving service awards were:

John Jacobsen, 20 years; Walter Claycomb, Horace Dowell, Harold Hawley, David Miller and Charlene Segar, 15 years; Juan Baldonado, James Daniel and Mary Gates, 10 years; and Walter Masters, 5 years.

Employees Volunteer For Vietnam After Tragic News At Page

Page Communications Engineers, Inc. suffered its first Vietnam casualties in a Thanksgiving Day ambush by Viet Cong near the city of Dalat. Eight Page employees were killed and three wounded.

When news of the disaster was told to Page employees, within a few hours no less than 15 people volunteered to go to Dalat to take the place of the casualties.

"It was a spontaneous demonstration of the extreme devotion our people have to our job in Vietnam," Bob Willson, Industrial Relations director of Page Communications, said.

Among the casualties were two Americans; one, Edward Ramsey, a civil engineer of Reading, Pennsylvania was killed. Another, Robert Phelps of La Mesa, California, station manager of the Page installation near Dalat, was wounded. Also mauled in the ambush were members of a military escort in the truck convoy proceeding to the Page installation about seven miles from Dalat. Three American G.I.'s were killed and 18 wounded.

The ambush took place when the lead truck of a convoy was blown up by a Claymore mine and blocked the highway. Viet Cong then poured a hail of ammunition into the six other vehicles of the convoy.

Management Club Installs New Officers at Dance

Ventura Management Club installed its new officers at the 11th annual dinner dance of the organization on Saturday evening, December 3, at Los Posas Country Club. The affair, attended by 280 Ventura management people and their families, was deemed "among the most successful," by club representatives.

New officers installed at the affair were: Carl Graham, president; Don Conlan, first vice president; Lou Florence, second vice president; Forrest Godfrey, treasurer; John Garfield, secretary.

(See NEW OFFICERS, page 6)

Sales Climb On MINIKO Yule Candles

Six officers from MINIKO, the Junior Achievement company which is counselled by officials at Northrop Ventura, were among more than 400 teenagers to attend a recent JA workshop in Los Angeles.

The meeting, bringing together JA members and their advisors from 183 companies in Los Angeles, Orange and Ventura Counties, was held in the Rodger Young Auditorium in Los Angeles.

Attending, with advisor Douglas Finch of the Northrop Ventura Graphic Arts department, were his son, Mike Finch, president of MINIKO; Toni McArthur, secretary; Stephanie Allan, vice president of sales.

Nona Berry, purchasing manager; Karen Pettyjohn, promotion manager; and Tony Anderson, production manager.

Techniques picked up at the all-day conference apparently paid off for the teenagers, as sales of Christmas candles—one of their two products—have passed.

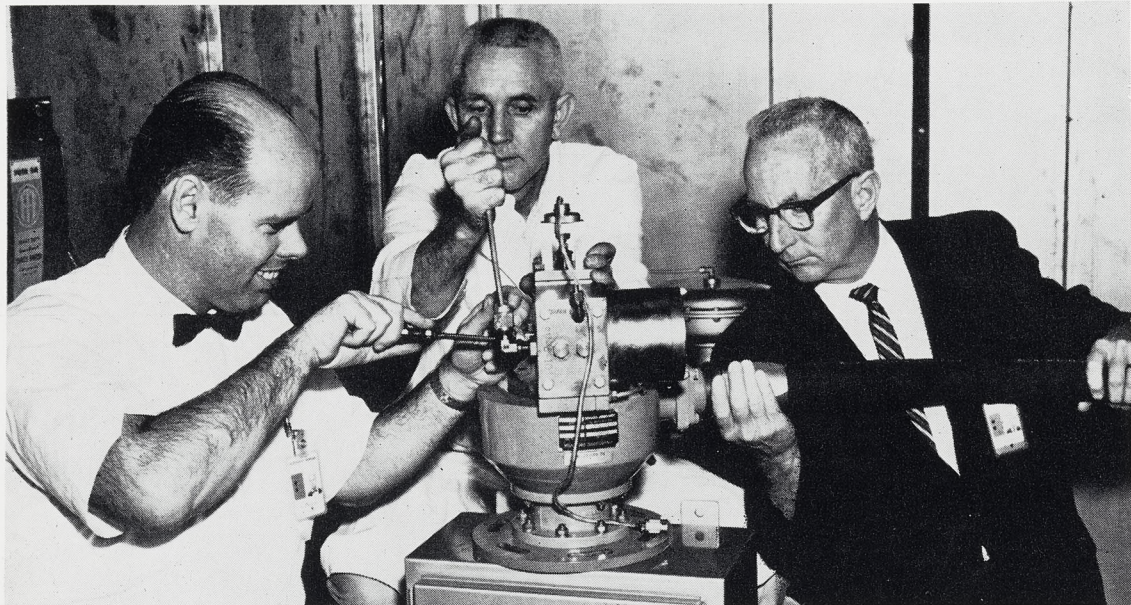
(See MINIKO, page 6)



DATA PROCESSING EQUIPMENT provides a background for Northrop Ventura's D. L. Jenkin, as he explains the operation of the equipment to students from California Lutheran College. The students, many of them majoring in business and management courses, were given a thorough explanation of the function of Northrop Data Processing equipment.



A MESSY JOB for teenagers in MINIKO is the addition of the snow-like decoration to their Christmas candles. Gold, silver or colored sparkle is added to the "snow," and holly or ornaments are then added. Working here are (from left) Nona Berry, Jim Johnson and Judi Romano.



NEW POTENTIAL MARKETS are forecast for the Noraircoustic generator. Necessary adjustments on the Mark V, 50,000 acoustic watt model are being made by (L. to R.) Don C. Skilling, acoustic specialist; Harold Spivey, acoustic technician and Royal Jackman, chief of Engineering Labora-

tories. A larger unit, also offered for sale is called the Mark VII, which is rated at 200,000 acoustic watts. These units, when coupled in a multiple system, are capable of producing more controlled sound power than anything else known in the field today.

Forecast An Expanded Market for Two Noraircoustic Noise Generator Models

"There is an expanded market for noise," says Ned Garlock, director of Major Subcontract Marketing at Norair Division. But he hastens to add, "controlled noise that can be adapted to testing and present aerospace programs. There is an increasing need to simulate the very high noise environment which aerospace products must withstand."

Some time ago, the Northrop News carried a story about the biggest controlled noise source in the world, the Noraircoustic generator, produced by Northrop for use at North American Aviation.

The device being used by North American can develop 400,000 acoustic watts. It is designed to test the effects of noise on operating personnel and critical electronic systems of the Apollo Lunar Orbital spacecraft when it is launched by the seven and one-half million pound thrust Saturn V booster.

Two Basic Sizes

The Noraircoustic generators are produced and marketed in two basic sizes. One is the MK V, rated at 50,000 acoustic watts. The other is the Mark VII rated at 200,000 acoustic watts. An acoustic watt can be heard when you turn your Hi-Fi up to the fullest, enough to drive you out of the house; that's one watt. Units can be combined in a multiple system as in the case of the North American Aviation installation, to provide greater over-all sound power.

The generators are high pressure (over 100 pounds per square inch) air modulators which can

produce band random or discrete sound energy (controlled noise). Spectrum shaping, in the form of adjustment of the high frequency or low frequency roll-off rates (terms familiar to Hi-Fi fans) and control of the frequency of maximum energy can be obtained within limits. Both models are driven by electrohydraulic actuators. To obtain rated output, the MK VII generator requires an air flow of 4500 SCFM at 120 psig, hydraulic flow of 30 GPM at 2500 psi and 100 watts of electrical control power.

Don Skilling, Inventor

The generators were developed and are produced in the Engineering Laboratories, Royal Jackman, chief. The inventor of the Noraircoustic generator is Don C. Skilling, Acoustic Engineering specialist. Mr. Jackman said that the unit originated by Mr. Skilling is "unique because it is capable of producing more controlled sound power than anything else in the field today. For instance, the unit sold to North American is capable of producing sound pressure a million times greater than the human ear can stand."

"Presently," Mr. Jackman said, "Noraircoustic generators have been sold to Lockheed in Rye Canyon, NASA Goddard Space Flight Center and Boeing, Seattle, as well as North American. The first small unit sold to Lockheed is being used for testing now and two larger units have been delivered to the Rye Canyon facility and will be installed soon."

The two Noraircoustic generators (Mark V and Mark VII) em-

ploy an electrohydraulic poppet valve actuator system which is able to convert air stream power to sound three times more efficiently than a siren system and more than 30 times as efficiently as a conventional loudspeaker system.

Several of these units in a multiple system can produce sound power up to a million watts.

Mr. Garlock said that the potential market for the Noraircoustic generator includes testing in simulated severe environments by government agencies, large companies, special testing laboratories and some universities.

Mr. Jackman pointed to another potential long range use of the generator. "Now that science is concentrating on oceanography, we have considered the use of sea water instead of air, to power the generator. This would entail design and development for the new environment but the potential for testing with undersea sound waves is as great as space, in some respects," he said.

Hakes Named Mariner '69 Project Head

The selection of Ralph Hakes to serve as Northrop program manager for the Mariner '69 Program has been announced by Dr. V. W. Howard, Norair vice president — Northrop Space Laboratories.

Mr. Hakes, formerly deputy program manager for Mariner '69, succeeds Robert Munk.

Mr. Munk has accepted an assignment as assistant deputy director in the Tactical Warfare Programs branch, Department of Defense, at the request of Dr. John Foster, director of Research and Engineering for the Department of Defense.

Prior to his latest assignment, Mr. Hakes was chief of Norair's M2/HL-10 Project.

He is a veteran of more than 38 years in engineering work, including more than 12 years with Northrop.

Mr. Hakes directed the design for the ballistic nose release system for the SM-62 intercontinental missile. He has worked extensively with NASA organizations on orbital and entry vehicles and has managed numerous studies of satellite systems.

Brian Fleming Wins Scholarship at USC

A Northrop Norair employee, the son of a 25-year Northrop veteran, has been named to receive a \$500 scholarship.

He is Brian Fleming of Manufacturing Control, the son of C. L. Fleming, also of Manufacturing Control.

Brian won his scholarship from the Los Angeles Chapter, National Association of Accountants "for outstanding potential in the field of accounting and scholastic achievement at USC."

Norair Gets Contract To Study Man's Ability To Work Under Stress

A program to establish man's capabilities under flight stresses which could be encountered in the Air Force's proposed Advanced Manned Strategic Aircraft (AMSA) will get under way in the near future at Norair Division of Northrop Corporation.

The program will be under the direction of Aeronautical Systems Division's Deputy for Systems Management, Wright-Patterson AFB, Ohio. Lt. Colonel John D. Ludlow is the program director.

An Air Force contract to conduct the program was recently awarded to Norair, where a ride quality simulator has been programmed to appropriate flight characteristics of two AMSA designs now under study by ASD.

With Air Force crews as subjects, the program is expected to help establish design criteria based upon man's ability to function under unusual flight conditions.

Amateur Radio Operators To Meet on December 12

Amateur radio operators interested in organizing a Northrop Radio Club will meet at 5 p.m. Monday, December 12, in the Northrop Recreation Club (NRC) Clubhouse, Hawthorne.

Bill Anderson of Norair, one of the men organizing the club, said the group's first activities will include classes in Morse code and radio theory. Instruction in these fields is necessary for obtaining licenses from the Federal Communications Commission (FCC).

A transmitting station will be established in the NRC Clubhouse, Mr. Anderson said. The FCC has been requested to license the station as W6VPZ, the call sign held by an earlier Northrop Radio Club.

Further information may be obtained from Mr. Anderson at Extension 1933.



GENE BOGGES, commissioner of the NRC Symphonaires for the past three years, has been named coordinator for the annual Centinela Valley Fine Arts Association Music Festival, December 20, at Hawthorne Memorial Center. The NRC Symphonaires are planning their third appearance at this event.

Social Security Taxes Will Be Higher in 1967

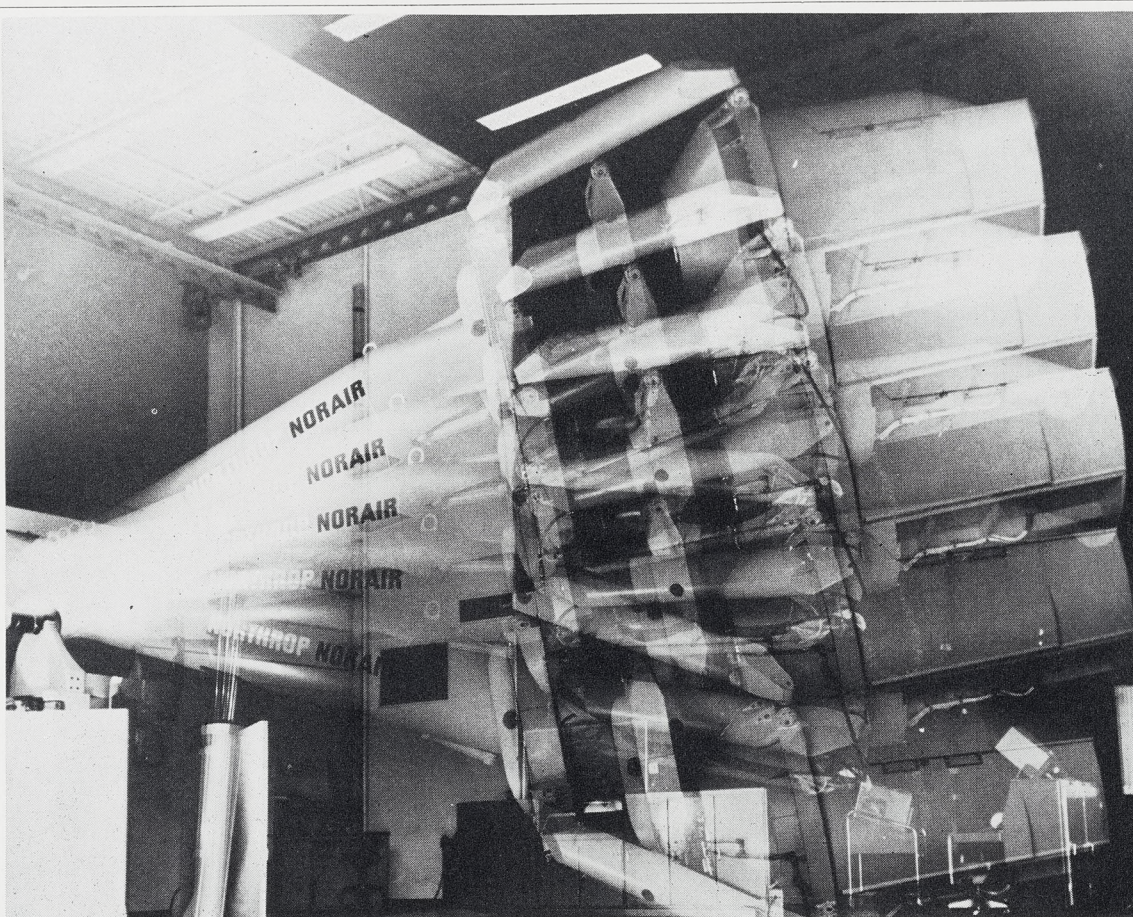
Initial paychecks covering wages Northrop Corporation personnel earn in 1967 will reflect an increase in social security taxes.

The increase was imposed by the Social Security-Medicare law passed by Congress in 1965.

The new rate is 4.4 percent of the first \$6600 in wages earned in 1967. Last year the rate was 4.2 percent of the first \$6600 earned.

Northrop Corporation will also pay a higher tax rate on behalf of each employee, matching the employee's social security contribution dollar for dollar.

To change the beneficiary of your savings bond, obtain a copy of form PD 1787 at any bank.



ROLL, PITCH, AND YAW modes of Northrop Corporation's large amplitude 3-axis flight simulator are shown in this multiple exposure photo. The large cockpit assembly is cantilevered on the end of a 24-foot beam and has a vertical translation of more than 20 feet; a lateral translation, or sideslip action, of plus or minus 4 feet; a roll capability of 45 degrees left and right; a yaw of plus or

minus 30 degrees; and a pitch of 5 degrees of freedom. Northrop claims its simulator is capable of reproducing the dynamic responses of any known aircraft with unmatched accuracy and can be programmed to provide precision motion cues in the dynamic frequency range of maximum interest for aircraft not yet manufactured, such as SST and hypersonic vehicles. Photo by Bill Cox.



MINUTE PRECISION is required as Tom Griffith of the Nortronics Hawthorne Optics Laboratory prepares a convex grinding tool for receiving a 30-inch mirror. (See photo at right.)



A SPINNING MIRROR, 30 inches in diameter, is carefully watched by Tom Griffith of Nortronics Hawthorne. Optical equipment is only one of the product lines of the labora-

tory. Others include prisms, optically flat windows, and components for condensing systems. The laboratory is in Norair's Plant Two.

NO OPTICAL ILLUSION

Telescopes, Prisms Keep Lab Busy

Photos by Bill Cox

Located within the walls of Plant Two in Northrop Corporation's Hawthorne complex is a unique Optical Development and Fabrication Laboratory.

coating system. All are commonly used by the laboratory.

ment was built at Northrop for use in furthering research and development.

Much of the laboratory's equip-

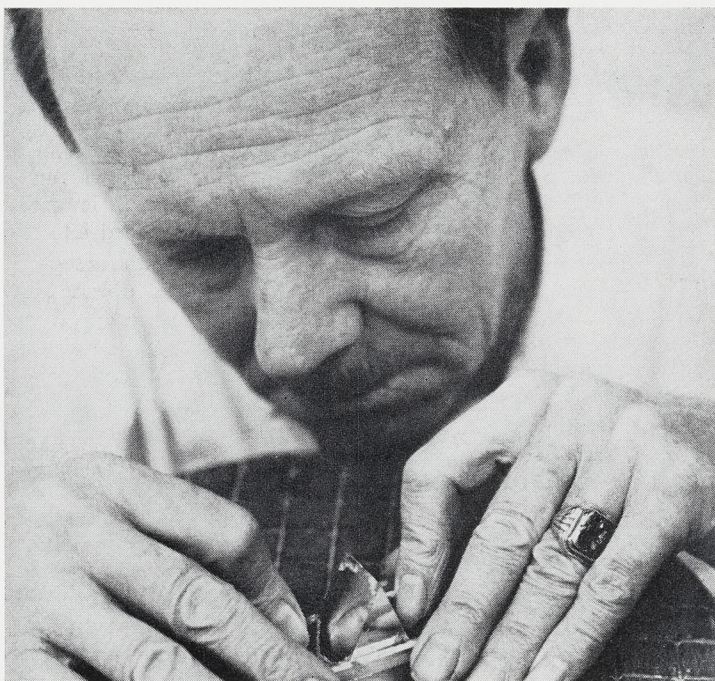
Personnel working within this facility represent more than 100 years experience in precision optics. Optical components and systems, large and small, have been and are being built. Most optics are fabricated to accuracies within a very few millionths of an inch.

"These," explains Paul Halderman, who is in charge of the lab, "are so accurate that they must be measured by interference of light, rather than by physical means."

Another important part of the capability is that of thin film vacuum depositions, including complex sequential coding.

Products include various sorts of lenses, telescopes, prisms, ground and polished to within one to two arc-seconds, and optically flat windows.

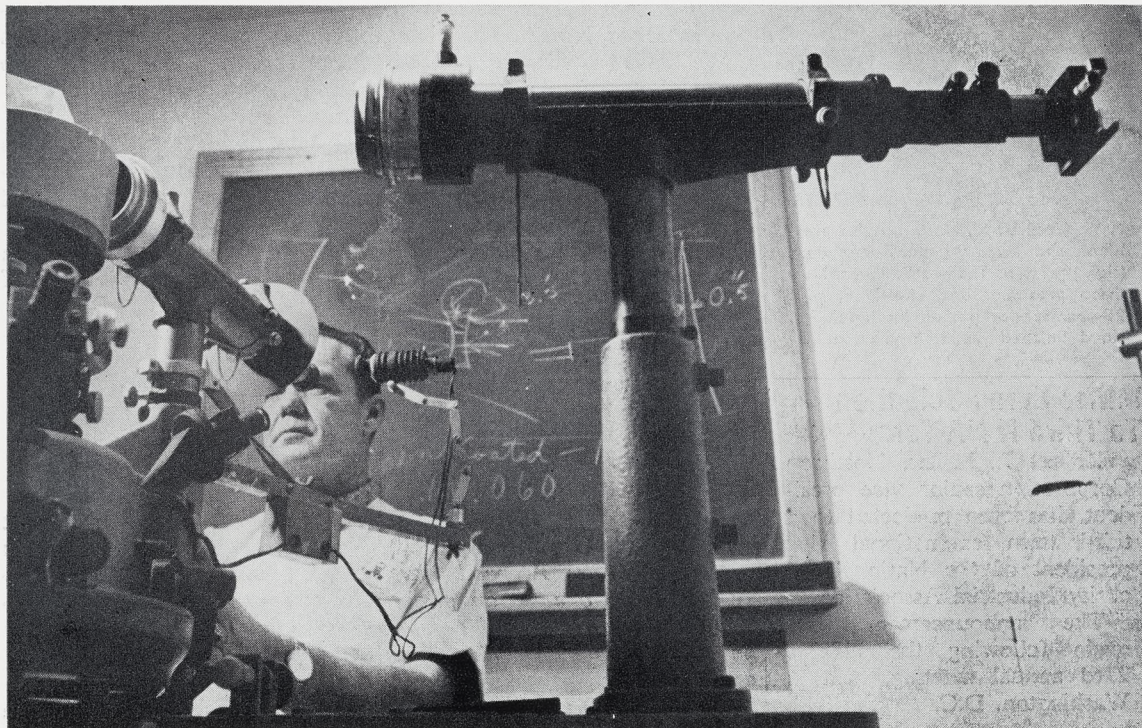
Spectrometers, microscopes, lens grinding and polishing machines, interferometers—and even such exotic-sounding names as Askania collimators, ellipsometers, a Tolansky gauge and a vacuum-

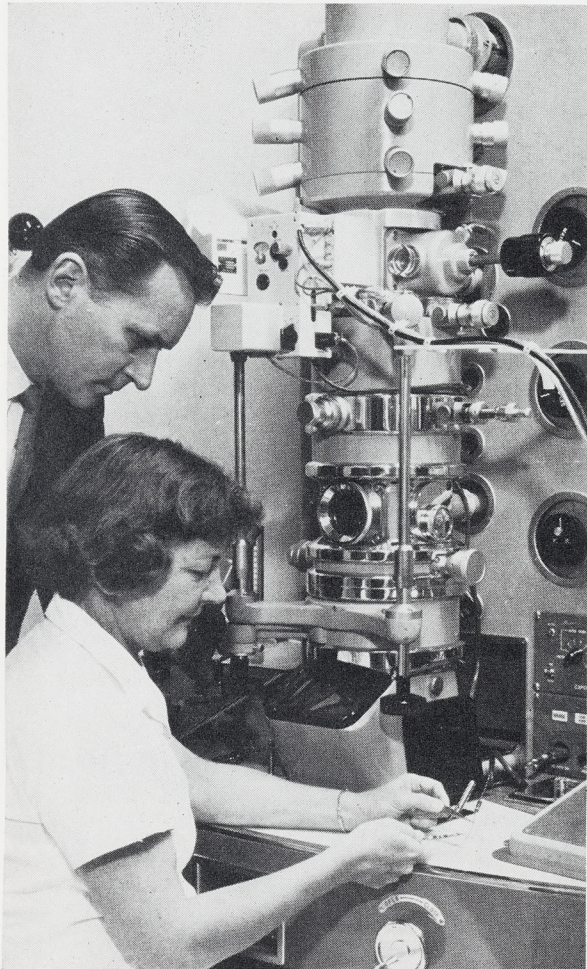


OPTICAL PRISMS, used in inertial platform systems and similar programs, need to be as near perfect as is possible. Above, M. E. Therssen hand-polishes a prism. Nortronics builds prisms to within 1 or 2 arc-seconds of a degree of accuracy. Below, Paul Halderman holds a six-faceted optical device which automatically centers a camera lens, even when the camera is moved. This is all-important in tracking and sighting systems.



LENS GRINDING is, of course, a primary function in an optical laboratory, and here, from left, Frank Stetson, John Bartos and M. E. Therssen work on grinding equipment. Much of the lab's equipment was developed and built there. Below, Mr. Stetson tests a lens for accuracy through use of a spectrometer.





ELECTRONS AT WORK—George Blake, research analyst, watches as Jean Donner prepares to cut small specimen from resistor wire. Behind them is electron microscope capable of magnifying specimen as much as six million times and performing crystallographical and spectrochemical analysis. For view of specimen cut see the accompanying picture.



DARKROOM VIEWING — Engineering Specialist Robert Herfert uses light table to view transparency made from negative exposed during electron microscope operation. Microscope is key tool in Norair's extensive materials research capability, was enhanced recently with addition of a new electron probe microanalyzer. Photos by Dave Saldana.



INSIDE THE WIRE—Specimen just .030 inches in diameter shown being cut in accompanying photograph looks like this when magnified 12,000 times by Norair's electron microscope. Dimples indicate possible ductile overload; impurities appear as crater-like indentations.

FIRST OF ITS KIND

Materials Research Adds Electron Probe Microanalyzer

Northrop Norair's extensive materials research capability was enhanced still further recently through the installation of an unusual addition to an existing system.

The addition is an electron probe microanalyzer. It was installed to complement present electron microscope capabilities.

The new unit is the first of its design in use in the United States and one of the few known in the world.

It will analyze, both crystallographically and spectrochemically, an identical area on the surface of a solid in a matter of a few minutes through a series of simple and orderly operations.

This complete research system,

comprised of the electron probe microanalyzer installed on an electron microscope, is actually several units combined into one.

It is an optical microscope. It is also an electron optics system used to focus an electron beam on a specified area. Electrons impinging on the sample generate secondary characteristic X-ray spectra of the elements present. The system is also an X-ray optics unit analyzing the X-rays emitted by the sample according to their wavelengths and intensity. It probes into the realm of molecules and atoms and allows visual study of the chemical units from which all matter is built.

Norair refers to the system as an Electron Microscopy Labora-

tory. It is operated by the Materials Research group's Metallurgy Research branch.

Obviously, the system's magnification factor alone is important in that it makes available for direct observation and study many previously unseen objects. The electron microscope itself is capable of magnifying from 400 to 6,000,000 times. The electron microprobe will examine an area one micron (that's .000393 inch) in diameter on the surface of a solid sample.

Norair utilizes this capability in a number of ways.

Applied research in materials is the single most important task delegated to the system. It serves Norair's extensive research and

development efforts in the field of titanium metallurgy, in processing, forming and joining these alloys into components and parts.

It is used to study the basic parameters associated with the mechanical behaviour of materials.

It will continue to be used in analyzing specimens from possible faulty or damaged aircraft and spacecraft components.

These samples, coupled with available knowledge, help skilled researchers determine what has happened, when it happened, and in most cases, why it happened.

This study is called electron fractography.

Information obtained is utilized in making decisions calling for redesign of the components, changes

in production techniques, or substitution of other materials for those used.

In addition, the expanded system will make it possible to seek additional study contracts for outside interests. At present more than 35 percent of the system's effort is devoted to such contracts.

"We are somewhat limited by the configuration of the specimens we study. But if we can see them, we can work with them," said Robert Herfert, Engineering specialist who heads the microscopy activity.

"We are particularly interested in working closer with other Northrop divisions to help solve their research problems in areas where this system may be employed," Mr. Herfert added.

John Oliver Will Be on Educational Television on Thursday, December 8

Northrop Corporation's administrator of Product Licensing, John E. Oliver, will be a guest this week on "R&D Review," an educational television series on KCET (Channel 28).



John E. Oliver

Mr. Oliver will appear with Dr. Martin Klein, the show's moderator, at 9:30 p.m., tomorrow. The hour-long show will be repeated at 8:30 p.m., Saturday.

Their topic will be:

"Licensing: Small Business Taps Big Research and Development."

Mr. Oliver will explain the opportunities for businessmen to produce and sell the unused inventions of large research and development organizations, as well as those of smaller firms.

He also will present ex-

amples of successful projects in that field and explain procedures for obtaining licenses.

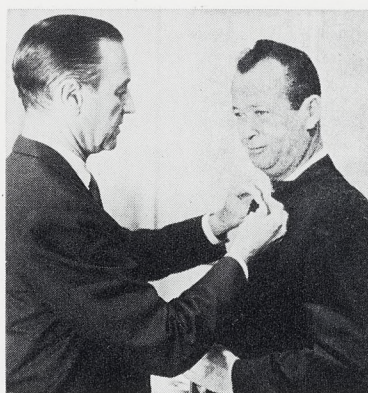
Other titles, and their show times, are:

"Navy's Research Submarines," 9:30 p.m., December 15 and 8:30 p.m., December 17; "NASA Patents and Procedures," 9:30 p.m., December 22; and "Fluidics," 9:30 p.m., December 29 and 8:30 p.m., December 31.

Retirement Club To Elect Officers

Members of the recently formed Northrop Retirement Club will meet at noon on December 14 to elect officers for 1967.

Outgoing president Norbert A. Lorentz said the Nominating Committee will submit its selection of officers, but nominations also will be open at the meeting, to be held in the Northrop Recreation Club (NRC) Clubhouse, Hawthorne.



F. W. (Bob) Lloyd, Northrop vice president and Norair general manager, (right) grins as Thomas V. Jones, Northrop president and chairman, pins 25-year service pin on his lapel. Mr. Lloyd finished his 25th year in November.

Miller Earns Selection To Third NSIA Term

Robert R. Miller, Northrop Corporation senior vice president, has been re-elected to a third term as national vice president of the National Security Industrial Association.

The announcement was made following the NSIA's 23rd annual meeting, held in Washington, D.C.

Letters to The Editor

From time to time, the Northrop News will publish letters from Northrop people which are of general interest. However, because of space limitations, publication cannot be guaranteed.

To the Editor, Northrop News:

We have a very nice newspaper. Lots of plane talk and plain talk.

I think it's time for a little FUN talk.

There must be loads of funny incidents that happen throughout this large company. Employees would submit funny incidents and the most humorous in a certain period would get a prize. Maybe 5 cents for an F-5 joke, 38 cents for a T-38 and 53 cents if it involved just anything. The contributor can also remain anonymous, if he so wishes. A good laugh never hurt anyone.

Mrs. R. S. Solomon
Organization 3430

Editor's Note: A good idea. And we'll go one up on prizes. The Northrop News will provide an on-the-job "8x10" picture of any employee with an accepted humorous story.

To the Editor, Northrop News:

Prior to my joining Nortronics, I was very safety conscious. I can say I am even more so now, as a Northrop retiree.

I am happy to note that a recent issue of the Northrop News stressed safety and gave it top priority, even more so than previously.

Please don't take my remarks wrong. We employees, responsible for safety, in our areas, did our best.

In 1957-58, I was given a plaque, which occupies a place of honor in my living room. I highly cherish this plaque. It reads:

Achievement Award to
George L. Basher—2171
For the most outstanding
contribution to safety
1957-1958

T. H. Quayle, Manager

I want to thank everyone at Northrop who helped obtain this award. Through the Northrop News, I extend a cordial invitation to anyone coming east, to vacation with my wife and self.

George A. Basher, Route 1
Titusville, Pennsylvania

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170. zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

Rides and Riders

Rides Wanted

7 a.m. — 3:42 p.m.

Imperial & Brea Blvd., Brea. Lois J. Varay, Norair, ext. 1485, 529-3538.

Rosecrans & Luitweiller, La Mirada. Jean Wigley, Norair, ext. 1834.

8 a.m. — 4:42 p.m.

Western & Normandie, Los Angeles. Mornings only. Margaret Paulos, Nortronics, Haw., ext. 603, PL 6-4389.

Sepulveda & Devonshire, Granada Hills. R. J. Rothstein, Norair, ext. 1188, 360-1377.

Simi Valley &/or Thousand Oaks to Hawthorne. Paul Schapp, Nor. Haw., ext. 833, 805-526-7767.

Rides Offered

8 a.m. — 4:42 p.m.

Sepulveda & Devonshire, Granada Hills. R. J. Rothstein, Norair, ext. 1188, 360-1377.

Simi Valley &/or Thousand Oaks to Hawthorne. Paul Schapp, Nor. Haw., ext. 833, 805-526-7767.

Four Norair People Are Honored For Attendance Records

Mrs. Rose Rose, a Northrop Norair employee since 1950, was late to work on July 8, 1952.

That's not too significant, you might think, but it is significant that in the 14½ years since then, it hasn't happened again.

And Mrs. Rose, who is in Electrical Assembly on the Boeing 707 wing panel section, has never been absent from work in her 16½ years with Northrop.

She joined Norair on January 20, 1950, compiling a perfect attendance record until that July day two years later. She had a month-long leave of absence in 1956, but never a recorded absence or another late day.

When you consider how easy it is to (1.) ignore the alarm clock, (2.) discover that your battery is dead or (3.) get snarled in traffic, that's an amazing record.

Equally outstanding is the record of Charles Edwards of Norair Manufacturing Control, who joined the company on February 24, 1954.

Mr. Edwards was absent on September 22 of that year, and missed another day on July 16, 1959. He's never been late, and hasn't missed a day of work in more than seven years.

That means that in the approximately 3200 working days he's been with Norair, Mr. Edwards has a record of 3198 and 2.

Everett Clark of Plant Protection, in his 15 years at Norair, has a record of one absence and one late day. And Paul Welter of the Boeing Wing assembly control booth section has been absent only three times in the past 11 years.

There's more to a perfect attendance record than the knowledge that you've established a reputation for reliability, too.

Each year, hourly paid employees in Norair Manufacturing who have compiled perfect or near-perfect attendance records for that year, are guests at a luncheon given in their honor.

The employees are given a certificate commending them for their reliability.

For Sale
Hilltop Lot , Paradise Valley, Yucca Valley, purchased for retirement home, golf course, country club estate, \$5000. L.A., 670-2604. A
Dishwasher , 1965 GE Mobilemaid, portable, used less than 11 mos., \$115. Torrance, 326-6195. A
Lawn Edger , McLain, gas-powered, \$30. Los Alamitos, GE 1-0843. A
Golf Clubs , 1 set, & bag, \$60. Hawthorne, 679-5436. A
Muffler , for MGB, never used, \$10. Hawthorne, 676-9993. A
Floor Washer , Regina, all brushes incld., \$30. Gardena, 329-9484. A
Airplane , Ryan PT-22, 480 hrs. on Kinner R-56 since new, new prop, spinner, tires, & rear glass, Skycrafter superphone, parachutes, helmets, spare parts, \$3500. Redondo Bch., 378-4654, 378-7869. A
Banjo , 5-string, long neck, \$150. Fullerton, LA 5-9715. A
Pups , miniature dachshund, AKC champ. stock, 2 black males, 1 red female, males, \$60; female, \$70. Torrance, DA 5-7806. A
Executive Desk , 3'x6', solid walnut w/glass top, \$225. Anaheim, 776-1322. A
AFB & Manifold , for 1955 to '61 Ford 272-292-312 engines, \$20. Norco, 737-1081. A
Pickup , ½-ton Chevrolet, 1965, low mileage w/Pilgrim walk-in camper, \$1950. Gardena, DA 4-7623. A
Lot , lge., level, all improvements in, 75x150, low down, \$17,950. P.V. Pen., FR 7-4943. A
Oil Cleaner , Frantz, for car, truck or boat, 1-yr. guarantee, 1-yr. supply filter cartridges, \$29.95. Torrance, 371-3620. A
Piano , upright, \$125. L.A., GR 4-7895. A
Weightlifting set , 110 lb., complete vinyl coated, \$15. Yorba Linda, 528-9227. A
Lot , lge. level, corner, Paseo del Mar, Lunada Bay, unobstructed view, underground util., \$1000 dn. or more at option of buyer, will carry bal. at 6%, \$21,000. Rolling Hills Ests., 377-0146. A
House , 3-bdrm., 1¼ baths, covered patio, sprinklers, 2 blocks from El Camino, 10% down, \$24,950. Huntington Bch., 714-842-2636. A
Apt. , close to schools, bltins, pullman-type kitchen, 4-bdms. or 3-bdrm. & den, ½-bath on 1st flr., 2 baths on 2nd, dps., 2-car gar., pvt. patio, clubhouse, lge. pool, \$29,500. Torrance, 327-3160. A
Ford , 1960 Starliner, w/s/w, p/s, p/b, r/h, new reverb. radio, low mileage, \$500. El Segundo, EA 2-6595. A
Washer-Dryer Comb. , Philco Bendix, \$35. Torrance, 329-6748. A
Projector , movie, 8mm, Mansfield Holiday, ultra-automatic, used 3 times, \$60. Lynwood, 638-3423. A
Surfboard , Bing, 8'8", no dings, \$40. Inglewood, 757-7824. A
Buick , 1962 Skylark convt., p/s, p/b, p/top, \$1055. Somis, 805-482-1186. A
Bicycle , boy's 16", sidewalk, Sting Ray-type, \$15. Gardena, DA 9-4675. A
Corvair , 1960, 700 series, 4-dr. sedan, r/h, stick shift, new brakes, seat covers & battery, \$350. Hawthorne, 675-4267. A
Boat , 13' fiberglass, Wizard, tilt trailer, no motor, \$295. P.V. Ests., 378-3055. A
Dining Table , Danish modern, hutch, 6 chairs, \$100. Gardena, DA 9-9621. A
Ducati , Scrambler, 250 cc, 1965, approx. 1500 miles, many extras, \$495. Hawthorne, 676-9736. A
House , 3-bdrm., family rm., 2-bath, cpts., dps., bltins, dishwasher, fenced yd., 2 yrs. old, \$2000 or less dn. to an existing 5¼% FHA loan, in Huntington Bch., \$21,300 or \$155 mo. rent. Torrance, DA 9-9464, DA 7-8994. A
Motorcycle , 1964 Yamaha YA5, elec. start, turn signals, just o/hauled, \$325 value; \$295. Torrance, DA 6-7528. A
VW bumper , front & rear for sedan, complete w/parts, \$15 ea. Huntington Bch., 714-897-8201. A
Chair , antique oak, leather covered, \$45. Playa del Rey, 823-4167. A
Childcraft Books , complete set, \$15. L.A., 670-5627. A
Couch & chair set , Danish modern, green, \$85. Inglewood, 673-1589. A
Boat , 1965 Dorsett, fiber glass, 16', sleeps 2, bait tank w/Wallstrong trailer, 65 h.p. Mercury eng., \$2300. Gardena, FR 1-3444. A
Falcon Ranchero , 1963, 260 Cobra, Hydro, 16 tires, spare parts, tow bar, \$1500. Long Bch., 421-2255. A
Range , Frigidaire custom deluxe elec., 30", cost \$330; \$150. Garden Grove, 714-892-2829. A
Crib , w/mattress, 4 yrs. old, orig. cost \$50; \$20. Harbor City, 213-325-8175. A
Travel Trailer , Shasta, 16', 1965, self-contained, sleeps 4 to 6, elec. brakes, & hitch, cost \$2200; \$1700. Hawthorne, 371-9931. A
Honda , 300, 1966, 3600 miles, \$450. Torrance, 325-6546. A
Stereo Tuner , FM, Fisher, 500-C, 75-watt, \$295. Torrance, 371-2137. A
Home , 3-bdrm., 2-bath, fam. rm., elec. kitchen, dble. ovens, dishwasher, cpts., dps., sprinklers, patio, lge. yd., in Hollypark, \$27,500. Gardena, 323-8657. A
Chevelle , 1966, 396-60 SS, 13,000 miles, 4-spd., AM-FM radio, new clutch, \$2300. Manhattan Bch., 374-8650. A

For Sale
Guitar & Amp. , elec., never played, cost \$95; \$60. So. Gate, 633-4477. A
Tape Recorder , 3-spd. stereo, 3 speakers, Telectro SS461, det. wing speakers, used approx. 60 hours, \$150. Hawthorne, 679-7618. A
Sloop , Columbia Challenger, 24', fiberglass, all racing-cruising gear, incl. spinnaker, 2 genoas, galley, motor, life-lines, \$5500. Box 2401 or Oxnard Bch., 805-483-1876. A
Chevrolet , 1963 Bel Air, 9-pass. sta. wag., auto. trans., p/s, p/b, r/h, luggage rack, trailer hitch, new tires, \$1525. Orange, 532-3743. A
Honda , 305 Super Hawk, 1965, new clutch, battery, paint & tires, \$525. P.V. Pen., 377-6352. A
Income Property , 2 houses, 2-bdms. ea. on 1 lot, triple garage, fenced yard, \$29,900. Torrance, DA 9-3706, 323-1400. A
Bicycle , boy's, 24", American made, \$15. Torrance, FA 8-3306. A
Movie Camera , 8mm Argus, & projector, turret lens, \$65. Brea, 529-3531. A
Chevrolet , 1966 Malibu, 327 cu. in., 4-spd., posi-traction, b/seats, \$225 & take over \$94 mo. pymts., approx. bal., \$2800. Gardena, DA 7-8412. A
Freezer , 1961, Majestic, upright, white, 22 cu. ft., \$185. Torrance, TE 5-7005. A
Guitar , elec. Fender Stratocaster, & case, \$225. Torrance, 371-9925. A
Wall Heater , 2 Thermador, 220 volts, w/ blower & thermostat, 3½"x14½"x21" for wall mounting, cost \$65 ea., \$20 ea. Redondo Bch., 370-9138. A
El Camino , 1959, 4-spd., custom interior, \$1000. Hawthorne, 671-9306. A
Radio & Record Player , Motorola Hi-Fi, AM-FM Harman Kardon tuner, 4-spd., \$75. Hermosa Bch., FR 4-6685. A
Organ , Hammond M-3 spinet w/almost new Hammond PR-40 tone cabinet & bench, \$1195. Box 2402. A
Boat , 15' fiberglass, 43.7 h.p. Scott o/board, trailer, 2 single skis, tow rope, jackets, 2 gas tanks, 12V battery, misc. extras, \$795. Torrance, 371-3753. A
Ford , 1954 convt., T-Bird eng., \$150. Inglewood, 644-2018. A
Hillman , Super Minx, new r/h, 12,000 miles, \$850. Gardena, 532-4368. A
Accordion , 120-bass La Scala, used four mos., cost \$487; \$275. Culver City, 836-4934. A
Surfboard , Roberts, 10' t-band, clear, black glass, skag tail block, \$80. Hawthorne, 676-8738. A
House , 5-bdrm., extra lge. living rm. & den, 2½ bath, 2700 sq. ft., w/w cpts., dps., all elec. bltins, patio, 5 yrs. old, on hillside, 2 lge. fireplaces, \$39,950. La Habra, 691-5166. A
Racing Bicycle , Schwinn Continental, 10-spd., \$50. P.V., 377-6515. A
SK Outboard , 1966, 95 Merc. & trailer, \$2100. Hawthorne, 370-7732. A
Ford , 1957 wagon, Country Sedan, auto. trans., \$175. Hermosa Bch., FR 4-3164. A
Buffet , old-fashioned, & 6 chairs, \$125. Inglewood, 674-1796. A
Austin Healey , 1958, Sprite, 1962 drive train, many extra parts, good tires, top & has roll bar, \$225. Torrance, FR 8-1102. A
Chevrolet , 1965, Impala, fac. air, p/s, new tires, radio w/rear speaker, p/windows, \$2650. Lakewood, HA 5-0229. A
Book , Advanced Engineering Mathematics by Wylie, new 3rd edition, cost \$11; \$10. Lawndale, 675-6803. A
Mustang , 1966, 007, 3-spd., 289 V-8, r/h, 8000 miles, \$2300. Torrance, 375-0165. A
Fishing Rod , Truline Dynamo, VL7-2, 1 yr. old, \$15. L.A., 837-4596. A
Mountain Cabin , 1000 sq. ft., 5-rm., complete w/bltins, garb. disp., forced air wall furnaces & lge. wood-burning fireplace, in Wrightwood, Calif., \$18,500. Thousand Oaks, 805-495-5967. A
Watch , gold, men's Movado, calendar w/date, day of week, & month, 18-K gold case, \$20. Marina del Rey, 823-2655. A
Drill Press , 9" bench, swing-a-way, w/motor, \$35. Downey, ME 3-6082. A
Ski Rack , for VW, holds 4 pair, \$5. L.A., 645-1274. A
Hide-A-Bed , Simmons, traditional styling, wine Naugahyde, orig. price \$220; \$100. Torrance, 320-5846. A
Rambler , 1964, Classic, 8-cyl., 2-dr., r/h, 2600 miles, p/b, p/s, w/s/w tires, \$1300. Hawthorne, OS 6-4231. A
Yamaha , 1966, YDS-3C Big Bear Scrambler, heads milled & polished, big tires, \$500. L.A., 645-1523. A
Rifle , Mannlicher-Schoenauer, .257 cal. Weatherby, fully engraved Premier grade w/3-9X Redfield scope on G & H mounts, incl. reloading dies & orig. box of ammo, 10 rounds fired, cost new \$1046; \$675. Hawthorne, 679-7544. A
Boat , 16' Traveler Atlas Deluxe, new in June, '66, 80 h.p. Evinrude eng. w/pushbutton trans., fully equipped, American tilt trailer, lge. wheel, orig. cost \$3100; \$2200. Canoga Pk., 340-6419. A
Porsche , 1963 coupe, r/h, new tires, \$2600. Santa Monica, 395-7368. A
Television , 19" Admiral, 1965, UHF all-channel w/stand, cost \$140; \$90. Hawthorne, 675-9681. A

For Sale
Radio Transmitter , amateur, Heathkit DX100, \$55. Hawthorne, OS 6-6949. A
House , 3 baths, 3-bdrm, large rumpus rm., 2400 sq. ft. on ½ acre lot, 4 yrs. old, located in La Habra, low down payment if buyer qualifies, Norair Credit Union, Ext. 1117. A
Ford , 1965 Galaxie, 26,500 miles, air cond., p/s, p/b, \$1950. Pac. Palisades, 454-5001. A
T-Bird , 1960 convt., orig. owner, 52,800 miles, 3-spd. stick shift, new tires, clutch & trans., \$500. Manhattan Bch., 454-2090. A
Boat , 14' runabout, 25 h.p. Merc., steering controls, lge. wheel trailer, gas tank, life preservers, \$200. Simi, 805-526-7767. A
Pups , collie, AKC reg., 2 blue, 2 tri, 2 sable, \$100 to \$50. Torrance, 371-2159. A
House , 2-bdrm., in Running Springs, 6000 ft. elevation, 2 yrs. old, 1000 sq. ft., lge. living rm., fireplace, bltins, \$14,500. Wilmington, 834-4184. A
Wheels , 4 mag-style, aluminum, 15", \$75. Lakewood, 634-8632. A
Thunderbird , 1955, rebt. eng., chrome wheel, new paint, \$900. Gardena, 324-5938. A
Ford , 1961 Fairlane 500, 2-dr. r/h, \$325. Rolling Hills, FR 7-1732. A
Love Seat , light maple, makes into bed, yellow, olive, white flowered Naugahyde, \$85. Gardena, DA 3-5497. A
Studio Couch , \$25. Hawthorne, OS 6-3410. A
Headboard , matching bookcase, & 2 night stands w/3 drwr. ea., blonde finish, plate glass tops, \$60. Torrance, DA 5-5245. A
Sail Boat , Kite 11'7" racing dinghy & trailer, \$675. Hermosa Bch., 376-3693. A
Honda , S-90, luggage rack, dual mirrors, helmet, cost \$450, \$300. San Pedro, TE 3-4272. A
Projector , 8mm Tower model, 750 watt, forward, still, reverse & rapid rewind, \$25. Hawthorne, 675-8413. A
Bicycle , girl's 20", new tires & tubes last year, \$10. P.V., Pen., FR 7-4317. A
Volkswagen , 1965 sedan, 13,000 miles, \$1475. Rolling Hills Ests., 377-0679. A
Stereo , Magnavox, 3-pc. component, \$100. Torrance, 328-3576. A
Chevrolet , El Camino, 1959, 4-spd., r/h, newly painted & reuphol., good running cond., \$695. Hawthorne, OS 5-7938. A
Pups , Pomeranians, AKC, broods & stud, \$75. & up. Lawndale, 371-0886. A
Train Parts , HO cars, engines, track, switches & accessories, \$25. Torrance, 371-8395. A
Couch & chair , \$25. Hawthorne, 676-3883. A
Poodle , male, toy, white, AKC, \$50. Hawthorne, 675-8360. A
Surfboard , yellow fiberglass, \$75. Box 2403. A
Sunbeam Rapier parts , for 1960, 2-dr. h/top, 4-spd. o.d. trans., \$25, other parts, various prices. Lynwood, NE 5-3294. A
Interest , 1/6, 1961 Piper Colt, ideal for getting pilot's license, time-bldg., \$300. Hawthorne, 674-8170. A
Speaker Enclosures , 2 solid light oak, modern, for 12" speakers, console type 30" high, \$30 pr. L.A., VE 8-3255. A
Truck , 1965 Chevrolet, w/1965 deluxe shell camper, long wheel base, wide bed, 8000 miles, new car warranty, \$2300. Inglewood, OR 4-08/0. A
Home Bar , 2 stools, glassware & all access., \$50. Redondo Bch., 370-8350. A
Mustang , 1965 convt., V-8 eng., auto. trans., p/s, \$1850. Rolling Hills, 547-2716. A
Aquarium , 22-gal. w/variety of trop. fish, u/ground filter, artificial plants, fluorescent light & stand, heater & aerator, \$40. Hawthorne, OS 5-1847. A
Drafting Machine , Bruning, 1964 model, \$65. Torrance, DA 4-7892. A
Mobile Home , 1957, Universal, 8'x40', 2-bdrm., lge. bathroom, awning, furn., storage cab., near Northrop, \$1500. L.A., 754-7289. A
Accordion , 120-bass, \$95. Redondo Bch., FR 5-4448. A
Bicycle , girl's 20" w/training wheels, convert to Sting Ray, \$12. Redondo Bch., 378-7116. A
Chord Organ , Magnus, wood const., cabinet incld., cost \$149; \$65. Maywood, LU 2-1079. A
Mattress , Sealy Deep Sleep, & matching box spring, full size, tuftless, \$40. Hawthorne, 675-8829. A
Honda , 1965 150cc, new clutch, good tires, Hawthorne, OS 5-4380. A
TV , black & white 23", Packard Bell, maple console w/doors, remote control, \$75. Harbor City, 326-1856. A
T-Bird , 1961, full power, factory air cond., \$1150. Inglewood, 677-7430. A
Volkswagen , 1965 1500S Variant, \$1750. Anaheim, 828-3718. A
Rug , braided, oval, 9'x12', \$35. Gardena, 323-8905. A
Camera , Yashica 8mm, light meter, type A filter, power zoom lens, pistol grip, light bar, \$70. Torrance, 378-0493. A
Freezer , 19 cu. ft., upright, new motor & freezer unit, \$135. Lakewood, HA 1-5128. A
Phonograph , Magnavox, portable, stereo, \$40. Redondo Bch., 372-8502. A
Hi-Chair , Cosco, blue plastic covered seat & back, chrome tray & legs, \$7. Rolling Hills Ests., FR 5-9689. A

For Sale
High Chair-Youth Chair Comb. , good cond., \$7. P.V. Pen., 377-9666. A
Guitar , Kay, w/case, practically new, \$35. Torrance, DA 6-8273. A
Battery Charger , Universal 6V-8V-12V, for car or boat, \$4.40. Box 2404. A
Bicycle , 20" Stelber, w/training wheels, needs repair, \$10. Torrance, 371-5916. A
Wanted to Buy
Pickup Truck , for transportation & second car which runs good, no auto. trans. Hawthorne, 679-4237. B
Supercharger , Paxton McCullough, VS-57, also elec. or gas welding equipment. Whittier, OX 3-4117. B
Dog House , w/waterproof roof. Hollywood, HO 3-5337. B
Skis , metal or wood, good condition. Will pay up to \$50. P.V. Pen., 377-4489. B
Rentals Offered
Apt , 1-bdrm., furn., modern, cpts., dps., bltins, air-cond., convenient to frwys., 20 min. to Norair, \$105 mo. Mar Vista, 391-7781. E
Apt , furn., single, including utilities, patio, kitchen, \$85 mo. Manhattan Bch., 545-1111. E
Apt , lge. 1-bdrm., furn., walking distance to Northrop, \$90 mo. Hawthorne, OS 6-4734. E
Apt , 2 & 3 bdrms., furn. & unfurn., bltins, cpts., dps., pool, recreation room, sauna bath, 5 minutes from Northrop, \$145 & up. Hermosa Bch., 372-5808. E
Apt , 1-bdrm., cpts., dps., bltins, 1-car gar., 2 blocks from Northrop, \$95 mo. Hawthorne, OS 5-5736. E
House , unfurn., 3-bdrm., 2½ bath, lge. pool, patio, dress. rm., family-dining rm., stone fireplace, cpts., dps., bltins, incl. water, yard & pool care, option to buy, \$290 mo. Inglewood, 644-2565. E
Apt , 1-bdrm., extra lge., pvt. patio, \$150. L.A., 681-9474. E
Vacation Cottages , Idyllwild, 1 & 2 bdrms., fireplace, stream, patios, \$20-\$35 w/ends, \$45-\$70 wk. L.A., PL 4-5288. E
Apt , 1-bdrm., cpts., dps., bltins, 2 mins. from Norair, unfurn., \$105 mo. Hawthorne, 679-3217. E
Apt , 1-bdrm., conv. den, 1½ bath, all elec. kitchen, fireplace, patio, full rec. privileges, on golf course near Del Amo Center, \$235 mo. Rolling Hills Ests., 325-7161, 373-3060. E
Vacation Cabins , Lake Gregory & Crestline, \$25 w/ends; \$60 wk. Venice, EX 1-2040. E
Exec. Apt , 2-bdrm., 2-bath, 1600 sq. ft., lux. features, \$200 mo. Inglewood, 670-6084. E
Apt , 2-bdrm., unfurn., cpts., dps., bltins, closed gar., pvt. patio, not water & trash paid, \$125. Torrance, FR 5-0867. E
Apt , 1-bdrm., furn., or unfurn., w/w cpt., dps., forced air heat, bltins, 2 blocks from Norair, adults only, \$95-\$110. Hawthorne, OS 6-5425. E
Apt , 1-bdrm., deluxe, pool, \$95. Redondo Bch., 376-2117. E
Apt , 2-bdrm., dining rm., laundry rm., water, trash paid, gar., across from snopping, \$95 mo. Hawthorne, 325-5705. E
Apt , 2-bdrm., 1¼ bath, all elec. bltins, cpts., dps., ground flr., no children under 16, gar., near Del Amo shopping center, \$150 mo. Torrance, 830-4406. E
Bachelor Apt , utilities incld., no pets, a few blocks to Northrop, \$65 mo. Hawthorne, 679-8394. E
Apt , near King Harbor, half block from shopping center, piped music, bltin vacuum, \$95 & \$105. Redondo Bch., FR 6-9608. E
Rentals Wanted
House or Apt , lge. 2-bdrm., in Redondo Beach or Hawthorne, will manage apts., under \$90. Redondo Bch., 374-8232. F
Child Care Offered
In my home , hot lunches, 6' brick fenced yard, play equipment. Redondo Bch., DA 4-6155. G
Child Care Wanted
Light Housework , & 1 school child & 1 preschool, room & board plus small monthly salary. Hawthorne, 675-5265. H
Woman to come to my home & care for 2 children, ages 4 & 5, own transportation, from 7:30 a.m. to 5 p.m. Gardena, 323-8165. I
Personals
Fly new Cessna 150 Commuters, \$7 per hr. wet, students welcome, 2 flight instructors, 4-place to be added soon. Torrance, OS 6-1338, DA 5-5288. L
Thanks to all my friends at Norair & Nortronics for the cards & calls I received while in the hospital. Am now at home & calls will be appreciated. MAE E. IVY. L
Roommate wanted , girl, 31-30 to share w/ same, Anaheim area, very reasonable, Box 2405. L
For Sale or Trade
Trombone , Beuscher Grand, \$65 or trade for clarinet. P.V. Pen., 377-3806. M
Barbecue , gas, Charmglow, even-controlled flame w/rotisserie, chicken bask., shelf, never been used, retail price, \$102; \$75 or consider trade for stereo tape equip. San Pedro, 831-4526. M



KENNEDY SPACE CENTER in Florida is the site where Larry Richardson (left) of Northrop Ventura packed all parachute systems in the recently completed Gemini series. Here, Mr. Richardson and Sam Beddingfield, chief of Mechanics and Ordnance for Kennedy Space Center, inspected the main

parachute for the Gemini 12. Officials from NASA and McDonnell Aircraft Corporation, prime contractor for the Gemini, commended Mr. Richardson for his work as Ventura's representative to Cape Kennedy.

(NASA Photo)

Page Gets Contract Awards Totaling Over \$9,500,000

Page Communications Engineers, Inc., a subsidiary of the Northrop Corporation, has been awarded two contracts with a combined value in excess of \$9,500,000 for military communications systems in Europe and Southeast Asia.

New systems to link Supreme Headquarters Allied Powers Europe (SHAPE) in Belgium and the Allied Forces Central Europe (AFCENT) headquarters in Holland will be designed and installed by Page under a \$3.5 million contract award in Paris by SHAPE.

Page, as systems engineer, said that major equipment for the project will be produced from industry in Italy, Germany, and the United States. The system is scheduled to go into operation by April 1, 1967, the deadline for departure of NATO forces from France. Both SHAPE and AFCENT are now based near Paris. The project calls for three links using tropospheric scatter technique — bouncing signals off the troposphere — and three links using line-of-sight communications.

The Army Electronics Com-

mand, Fort Monmouth, New Jersey awarded a \$6,068,653 contract to Page for services for the Integrated Wideband Communications System (IWCS) in Southeast Asia.

This contract follows an award in July to Page for a \$71.1 million contract to engineer, install and operate an IWCS in a portion of Southeast Asia. That order represented the largest single contract ever awarded by the Army Electronics Command.

The Northrop subsidiary, based in Washington, D.C., is active in management, design, installation and operation of world-wide communications systems on five continents.

NEW OFFICERS (Continued from page 1)

New directors taking office were: Ken Geller, Manufacturing; Robert Peterson, Quality Control; Ted Randolph, Administration; W. E. Green, Engineering.

Directors serving a two-year term, elected last year are: Gene Ozga, Marketing; D. D. Sherwin, Finance and Robert Anderson, Nortronics, Applied Research.

MINIKO

(Continued from page 1)

ed the 60 mark, for a gross income of nearly \$125.

The group hopes to sell a total of 200 of the six-inch, decorative snow-covered candles by Christmas, and is planning to sell them on weekends at three shopping centers in Ventura County.

The candles, made by the company's 22 members, are sprinkled with gold, silver or colored glitter and are decorated with Christmas ornaments or holly. They cost \$1.95.

After Christmas, the teenagers will concentrate on the manufacture of automobile trunk tie-downs. These, expected to sell for \$1, have a spring with a hook on either end and are used to secure a car's trunk when an oversized load won't permit it to close entirely.

Mr. Finch is in his sixth year as an advisor to the Junior Achievement program. Advisors and Achievers—as JA calls the students—meet weekly at Thousand Oaks High School.

Junior Achievement began in 1919 in Springfield, Massachusetts, and has spread to every area of the United States and Canada.

Working with Mr. Finch as advisors are Roger Marshall, Chuck Taylor, Walter Knox and Sherry Cable.

Mr. Marshall, from the Northrop Ventura Photo Lab, served with the first Peace Corps group to work in Chile. He has been active in many youth activities. He is production advisor.

Mr. Taylor is management advisor, and Mr. Knox is alternate advisor. Both are in the Ventura Budgets department.

Mrs. Cable, of Industrial Relations, is coordinator.

TOUR

(Continued from page 1)

The students—Mason Parrish, Don Pierce, W. B. Winterbourne, Mrs. Elsie Van Hoven and Laverne Hodel—were accompanied in their November 22 tour by Charles C. Brady, coordinator of Vocational Education for the Ventura School District.

D. E. Martin, Ventura Photo Lab chief and L. J. Sessions, Reproduction supervisor, conducted the visit.

Manpower Loan Sends Venturans To Boeing Plant

Three Northrop Ventura men are in Renton, Washington, working with The Boeing Company in engineering and design capabilities.

The three—John Rahder, Hal Berry and Harvey Linebarrier—are on a type of manpower loan assignment, which Ventura officials call "general engineering."

Mr. Rahder, an associate engineer, is working at Boeing on body design on the 747 program. He has been in Washington since July and will return to Ventura about February 1.

Mr. Berry, a senior designer, is in 747 equipment installation at Boeing. He began working there in May and is expected to remain until next May.

Mr. Linebarrier, a senior engineer, arrived in Renton on October 10 to work in Materials and Process. He is scheduled to return before Christmas.

Other Ventura engineering and technical personnel who were sent to Boeing to bring back designs and specifications on the 747 program have already returned.

Ventura's Merlian Receives Post in Conejo Chamber

Chuck Merlian, Northrop Ventura chief of Management Systems and Organization, has been named a director of the Conejo Valley Chamber of Commerce for 1967.

He also has been named to the chamber's Area Development Committee. Installation of Mr. Merlian and the other officers will take place in January.

Mr. Merlian's appointment continues Northrop Ventura's record of active service to the chamber, which serves businesses and commercial firms throughout the Conejo Valley, including several communities.

Rex Fairless, director of Industrial Relations, was chamber president in 1965 and served as a director this year.

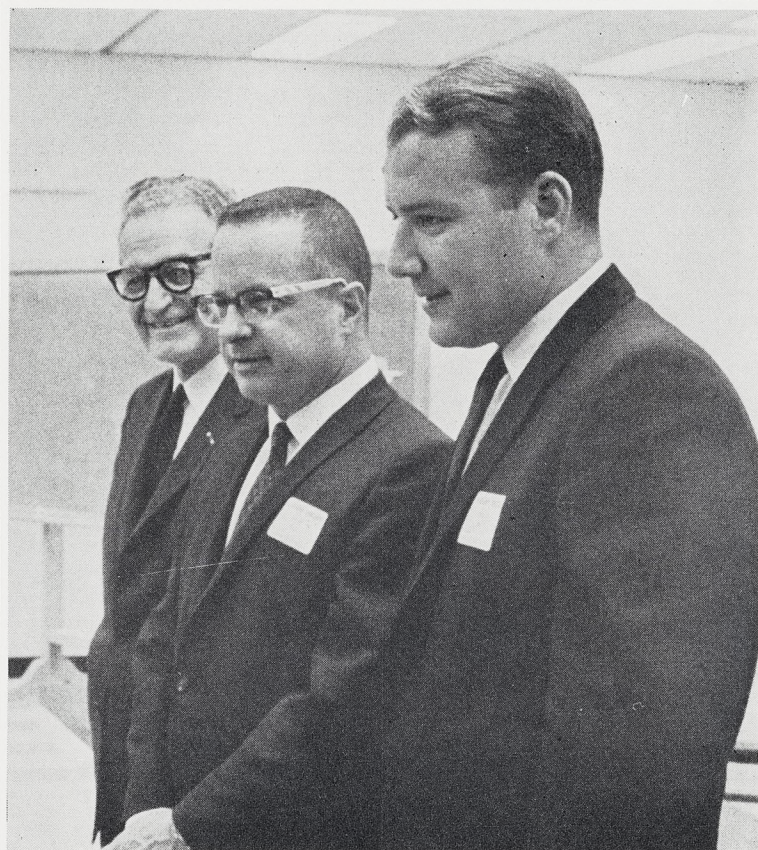
Henry Still, director of Public Relations, has been active in the chamber's annual Conejo Valley Days celebration.

Mr. Merlian also is a member of the Aerospace Organization Planning Roundtable (AOPRT).

The most advantageous time to redeem Series E Bonds is on the anniversary date of the bond or at 6 months intervals thereafter to get the highest yield.



SELECTED AS NEW TACTICAL SUPPORT aircraft for Canada, an F-5 is in formation flight with a Canadair CL-41, two-seat basic trainer of the RCAF. Canadair, Ltd. has begun production of 125 F-5's, which will be built to Canadian specifications and will be known as the CF-5.



GUEST SPEAKERS at the Aerospace Organization Planning Roundtable (AOPRT) meeting held at Northrop Ventura recently were (from left) John B. Joynt, Donald G. Malcolm and Ken Farley. Mr. Joynt is president of a New York management firm. Mr. Farley and Mr. Malcolm are from Management Technology Incorporated, in Los Angeles. Aerospace officials from throughout the country attended the meeting.



A CONVINCING SALES TALK is given to Tom Flannigan, Northrop Ventura director of Marketing, by Stephanie Allan, vice president of sales for MINIKO. At right is Bob Bowditch. Several members of the Junior Achievement company visited Ventura recently, conducting sales of their Christmas candles.

NORTHROP NEWS

Holiday
Greetings
1966

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Shareholders Hear Sales Forecast

T.V. Jones Sees Rise of \$90 Million

Northrop President Thomas V. Jones told company shareholders at the annual meeting last week that he expects Northrop sales in fiscal 1967 to approach the \$450,000,000 level, an increase of \$90 million over the record high of fiscal 1966.

The first quarter of fiscal 1967, which ended October 31, has already started the business year off to a new record setting pace. Sales for the quarter totaled \$102 million compared with \$70 million in the same period last year. It was the best quarter, with one exception, in the company's history.

While Mr. Jones could foresee new record sales in 1967, he told shareholders he was reluctant to say that the company would maintain the 2.9 percent profit margin posted in 1966. He cited higher taxes and higher interest rates as two factors which might retard earnings. He added that even so he expected total dollar earnings and per share earnings to be higher than last year.

Among other significant points made by Mr. Jones in his brief address were:

—Sales of the Boeing 747 jet transport may be double the number upon which Northrop based its initial calculations as to earnings potential. Original estimates of the value of Northrop's work on the world's largest passenger jet were in excess of \$400 million based on 200 shipsets.

—Northrop Carolina, which Northrop acquired last year, has increased its sales very substantially, and "we feel it has been an advantageous acquisition."

—Of the five major areas of Northrop business — aircraft, communications, electronics, advanced weaponry, and space — communications and advanced weaponry will make the biggest gains in fiscal 1967.

—Although Northrop is a contractor to Boeing on the supersonic transport (SST), the company's know-how in structures and in the handling of titanium should be useful to whoever wins the SST competition.

—The company is now active in 50 countries, and, Mr. Jones said, "there is almost nothing that we do whose in-

(See **SHAREHOLDERS**, page 4)

Speakers to Begin Eight-Week Class

A "Speakeasy" course in public speaking, sponsored by the Northrop Norair Toastmasters Club, will begin on January 12, club officials have announced.

The course will be held on eight consecutive Thursday nights, starting with the January 12 meeting, in the Norair Executive Dining Room.

Further information may be obtained by contacting Felix Dunnett of Norair Management Systems on Ext. 1146.

Mr. Dunnett was one of three Norair Toastmasters members who led the group to a "sweep" over the Westchester Toastmasters in competition early this month.



A CHRISTMAS VISIT to Northrop Corporation facilities finds President Thomas V. Jones (left) talking with Frank McIntire, a Northrop Ventura machinist. Mr. Jones visited Ventura on Monday, and toured other local facilities later in the week.

CAPABILITY STRENGTHENED

Nortronics, Space Laboratories Form New Technical Systems Organization

Establishment of a topflight technical organization to be known as the Northrop Systems Laboratories has been announced by Thomas V. Jones, Northrop president.

The new laboratories will be a department of Northrop Nortronics and will be formed by combining certain of the advanced scientific activities of Nortronics with those of Northrop Space Laboratories.

Dr. V. W. Howard, formerly vice president and manager of the space laboratories, will head the Northrop Systems Laboratories and will be a vice president of Nortronics. He will report to Fred Stevens, corporate vice president and Nortronics general manager. Dr. Howard will make his headquarters at Nortronics Palos Verdes.

"One of the growing requirements of our customers is the need for new systems in the broad area of enabling man to operate effectively in new and relatively unfamiliar environments," Mr. Jones said. "For example, such systems are essential in any space system, in military command and control, in intelligence gathering, in identification and measurement, in the deep ocean environment, in the management of highly scientific programs, and in technically advanced airborne operations."

The new NSL — Northrop Systems Laboratories — is so named because, according to Mr. Jones, "a systems approach is absolutely essential in these areas."

Typical of the enhanced strength provided by the new organization is the joining of the outstanding optical and electro-optical work of Nortronics with that of the space laboratories.

Nortronics has long pioneered precision optical research and development on the West Coast, opening up a field

formerly dominated by Eastern optical experts. The space laboratories also have developed exceptional research talents in optics, directed originally to space requirements. Now the work of these two highly-advanced organizations will be combined in a larger, stronger activity capable of being even more responsive to customer needs.

"The new department will strengthen our capability in important areas and will provide opportunity for an interdisciplinary approach to many of the projects involved. Our confidence in the technical leadership and personnel of the new department leads us to believe that it will make an important contribution to the technical stature of Northrop," Mr. Jones said.

HALLICRAFTERS CHANGE NEARS FINAL APPROVAL

A contingent of Northrop legal and financial representatives are in Chicago this week meeting with their counterparts of Hallicrafters for the purpose of approving and executing documents which will make Hallicrafters the newest member of the Northrop Corporation family.

Shareholders of both companies voted their approval of the acquisition last week at their respective annual meetings in Hawthorne and Chicago.

To make the acquisition possible, Northrop shareholders authorized one million shares of a new preferred stock, which is listed on the New York Stock Exchange for the first time this week. From this authorization, 385,195 shares are being used in acquiring the assets of Hallicrafters. The remainder will be available for future expansion and other corporate purposes.

According to the plan of acquisition, one share of Northrop preferred will be exchanged for 8.1 shares of Hallicrafters common stock owned

by the Halligan family, which controls more than 50 percent of the outstanding shares. Public shareholders of Hallicrafters would receive one share of the Northrop preferred for each 5.6 shares of Hallicrafters common.

The Northrop preferred shares issued this month will be entitled to cumulative dividends at the annual rate of \$1.45. They will be redeemable at Northrop's option after December 31, 1971, at the price of \$35 per share plus accrued dividends.

After December 31, 1969, each share will be convertible, at the option of the holder, into shares of Northrop common stock at a price to be determined immediately prior to the closing but which will be no less than \$34 nor more than \$45 per share.

In discussing the acquisition, Northrop President Thomas V. Jones said: "After a thorough study and evaluation of the acquisition, we believe it will contribute to the strength, diversity and growth of Northrop. We

(See **HALLICRAFTERS**, page 4)

Discounts Planned On Hallicrafters Radio Equipment

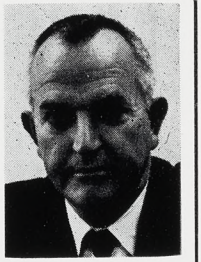
The acquisition by Northrop Corporation of the assets and business of Hallicrafters moved closer to completion when, on December 13, the shareholders of both companies approved the transaction.

The planned date of completion was December 20. Assuming that Hallicrafters becomes a member of the Northrop family, Northrop employees will then be able to avail themselves of the purchase of Hallicrafters' commercial products on a direct-factory basis at employee discount prices.

More than 50 commercial products will be offered to Northrop employees, which include all home entertainment receivers, citizens band transceivers, amateur radio products and accessories.



CHRISTMAS GREETINGS



To the Men and Women of Northrop:

As the holiday season approaches, I want to express my appreciation to all of you for your efforts in behalf of our company during the past year.

Each year I find it more and more true that one of the greatest satisfactions of working at Northrop is the warmth of the personal associations which so many of us enjoy and the pride we feel in the things we build. Not every company is fortunate enough to have this fine spirit.

Mrs. Jones joins me in extending to you and your families our warmest greetings for the Christmas holidays and our best wishes for a Happy New Year.

Thomas V. Jones
President and Chairman

To Northrop Ventura Personnel:

It is my wish and that of Mrs. Douglas that you and your families will enjoy a warm and happy holiday season and a prosperous 1967.

The new year promises a higher level of work for us, both at the division and corporate level. This improved outlook is a result of your efforts and devotion to duty, which I appreciate very much.

With the same effort and devotion, I am certain 1967 will be a good year for all of us.

George F. Douglas
Corporate Vice President and
Northrop Ventura General Manager



CHRISTMAS IN VIETNAM—Northrop secretary Barbara Hames loads Christmas packages into the family station wagon for shipment to 200 U.S. Army men in South Vietnam. She filled the packages with homemade cookies and

candy, "because I wanted to do something." Miss Hames will be married in May to a member of the unit she sent the presents to. (Photo by Bruce Howell, Santa Monica Evening Outlook.)

COOKIES TO VIETNAM

Secretary Plays Santa for Soldiers

She wouldn't deliberately try to upstage Santa Claus, but Northrop Norair's Barbara Hames is probably running him a close second in providing Christmas happiness for the largest number of people.

Miss Hames, a Quality Control secretary, decided in September to send Christmas packages to the U.S. Army's 17th Radio Research Unit in Bien Hoa, South Vietnam.

The fact that there are 200 men in the unit didn't bother her. She just bought extra ingredients for the homemade cookies, peanut brittle and other candies with which she filled 200 boxes.

"There's nothing to it, really," is how she describes the project, but those who have come in contact with her since she began working on it know that isn't so.

"It's a wonderful idea,"

said Howard Butler, also of Quality Control. "I don't know how she found the time or energy to do all she's done."

But Miss Hames minimizes her accomplishments.

"It's something that anybody would have done," she said. "I'm sure lots of people are doing much more for Christmas. I just wanted to show the boys in Vietnam that not all of us here in the states are a bunch of placard-carrying idiots."

Through neighbors who "leaked" the information, the story of Miss Hames' project has found its way into two daily newspapers near her hometown of Culver City.

Her fiance, Sgt. John Perello, is a member of the unit. At first, Miss Hames was going to send the men a Christmas tree.

"Then I started thinking about it," she said, "and I de-

cided I would send each of the men something. First, I thought of a gingerbread man, but then I figured the packages would be a better idea."

She asked her fiance to send her a roster of the men in the unit.

"He probably thought I was just going to send cards," she said. "It should be a real surprise for them."

Miss Hames bought more than 200 boxes (she sent extras, to make sure nobody was left out), baking goods, pamphlets depicting the Christmas story, and yards and yards of wrapping paper.

She and her family worked on filling the boxes, and the packages were mailed a few days after Thanksgiving.

Miss Hames and her fiance plan to marry on May 27. Sergeant Perello is due to be discharged in February.

Miss Hames is a choir director and Sunday School teacher at Culver City Foursquare Church.

gear their holidays, by contractual requirements, to those of governmental or military agencies they serve. Included are those within the United States, plus others on duty around the world.

However, the vast majority of Northrop people are looking forward to a mass exodus from work stations.

They will leave behind silenced machines and dark offices to be looked after by diligent security, maintenance and services personnel.

To some of the more active the holiday period, or at least a part of it, will afford an opportunity to follow their favorite sport or recreational pursuit.

More than 100 Northrop travelers will wing their way to a sun-filled vacation in Hawaii through NRC Travel Club arrangements.

Anaheim golfers will tackle the Mountain View Country Club links at Corona December 26-27, while Hawthorne area par chasers will try the Torrey Pines layout at La Jolla December 26-27. (See **HOLIDAY**, page 6)

NASA Officials Approve Cost Reduction Program

Northrop Corporation's comprehensive Cost and Management Improvement Program (CMIP) has once again been evaluated by National Aeronautics and Space Administration (NASA).

Review of Northrop's cost reduction efforts and the determination that they conform to the rigid standards established by NASA came early this month at a re-evaluation meeting held at Northrop Norair.

This was a re-evaluation in that Northrop passed a similar evaluation one year ago.

Aubrey Smith, chief, and John Miller, deputy chief, of Cost Reduction and Value Engineering at NASA's Marshall Space Flight Center, Huntsville, and George Nash, Cost Reduction monitor at the NASA office, Jet Propulsion Laboratory, conducted the evaluation.

Norair General Manager F. W. Lloyd and T. L. McCarthy, manager of Administration, took part in the opening phases of the session.

Northrop data considered in the evaluation was presented by a team comprised of Ken Davidson of Norair and Ken Hornor of the Corporate office.

The evaluation covered various aspects of Northrop's cost reduction activities carried out in accordance with guidelines established by NASA.

NASA specifies any contractor must successfully pass these evaluations on a periodic or annual basis, in order to be eligi-

ble for a contract which exceeds one million dollars.

Northrop Corporation is one of 39 contractors in the nation presently certified to have met all the criteria specified for in such evaluations.

Northrop also meets the same detailed requirements on all contracts performed for agen-

(See Photo, Page 4)

cies of the Department of Defense. The task of monitoring DOD contracts is carried out continuously through the office of Northrop's Air Force Plant Representative, Lieutenant Colonel R. K. Keeling, and Defense Contract Administration Services representatives responsible for other Northrop activities.

Executives Attend Seminar Groups; Others Planned

Northrop Nortronics has held initial orientation seminars in a new "Managing by Objectives" program instituted recently.

Twenty-seven Nortronics executives, including General Manager Fred Stevens and Ross Miller, vice president-Technical, attended the first two sessions held in the early fall at Lake Arrowhead.

Eighty-four supervisors took part in a three-day seminar held at the Hawthorne Municipal Airport Building in late October.

Assisting in implementing the program was Dr. John R. Van de Water, a management consultant, and his associate, Don White.

The program features a systematic approach to improving management performance and developing individual executive potential.

"Managing by Objectives" is a management method which has been installed on a pilot basis on the C-5 program," Mr. Stevens said, "and we will be evaluating results with a view toward possible extension of the program in other areas of Nortronics."

Bridge Club Members Will Elect Officers

A new Northrop Recreation Club Bridge organization for personnel in the Hawthorne area has selected the first and third Friday and the second and fourth Tuesday for regular sessions at NRC Clubhouse, Hawthorne. The time: 7:15 p.m.

Beginning January 6, duplicate bridge sessions will be played on a regular schedule. Officers will be elected by the club, January 10.



OBVIOUSLY INTERESTED in lecture by Dr. John Van de Water, management consultant, are members of Nortronics Hawthorne supervision attending a "Managing by Objectives"

program. Instituted early this fall, program has been confined to key management personnel assigned to C-5 navigation system, but may be expanded to other groups later.

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

SHAREHOLDERS (Continued from page 2)

ternational potential we don't explore very thoroughly."

Shortly after Mr. Jones' report, shareholders re-elected him and the other members of the company's 10-man board of directors to another term. Other directors re-elected (with years on board in parentheses) are: James Allen, Northrop vice president and assistant to the president (15 years); Lloyd L. Austin, chairman of the board of Security First National Bank (9 years); Edward W. Carter, president and director of Broadway-Hale Stores, Inc. (11 years); Earle M. Jorgensen, president and chairman of Earle M. Jorgensen Co., a distributor and manufacturer of metals (12 years); Richard W. Millar, a director of Glore Forgan-Wm. R. Staats Inc. (20 years); Robert R. Miller, Northrop senior vice president (10 years); John O'Melveny, senior partner of the law firm O'Melveny & Myers (24 years); A. E. Ponting, director of the investment banking firm Blyth & Co., Inc. (12 years); Albert C. Rubel, petroleum consultant (9 years).

Other major shareholder action included the approval of a plan to acquire the assets of the Hallicrafters Company, Chicago-based manufacturer of electronics and communications equipment, and the authorization of one million shares of a new Northrop preferred stock.

HALLICRAFTERS (Continued from page 2)

further believe that the growth potential of Hallicrafters will be enhanced by the contributions Northrop can make to the Hallicrafters operation such as added financial, technical, marketing and management resources."

Hallicrafters is a pioneer in the manufacture of short-wave radio transmitters and receivers for use by amateur radio operators. It has broadened its product base to include standard and FM band receivers for the entertainment consumer market, citizens band radio equipment, FM 2-way radio systems, and "Village Radio" systems for communications needs in the developing nations of the world.

Hallicrafters also enjoys an excellent reputation as a supplier of specialized electronic equipment to the military services. More than half (57.6%) of Hallicrafters' current volume of business is with the government.

Rentals Offered

Apt., 2-bdrm., cpts., bltin. oven, range, birch cabinets, thermo heat, garb. disp., TV, washer & dryer hook up, gar., child's play area, water and trash pd., \$105 mo. Torrance, 320-2827. E

House, walk to work, 3-bdrm., service porch, cpts., dps., stove, encl. patio, 2-car gar., close to all schools, avail. January 1, \$165 mo. Hawthorne, OS 6-6006. E

Owner's Unit, deluxe, 3-bdrm., 2-bath, stove, refrig., dishwasher, forced air furnace, AM-FM & inter-com. fireplace, pvt. patio, dble. gar., near Northrop, \$250 mo. Hawthorne, OS 9-7123. E

Apt., 2-bdrm., furn. & unfurn., cpts., dps., bltin stove, lower, walk to Northrop, Anaheim, \$110 & up. Fullerton, 526-3053. E

Apt., lower 2-bdrm., 2 blks. to Norair, cpts., dps., stove, bltins., no children, no pets, \$115. mo. Hawthorne, OS 6-7417. E

Rentals Wanted

House, 3-bdrm. or apt, near Norair, will take 2-bdrm. if it has back porch or small extra room, able to take care of yard for discount in rent. Inglewood, 672-4486. F

Lost

Diamond Wedding Ring, man's, 2 diamonds mounted in gold, lost Friday, 12/9/66, N.V. plant, \$25 reward. Calabasas, DI 0-9997. J

Personals

With sincere appreciation we extend our heartfelt thanks to all our friends at Norair for their concern & expressions of sympathy during our recent bereavement. OTTO & DOROTHY WALLS & FAMILY. L

We wish to express our deep appreciation to all our friends for the many thoughtful ways they expressed their sympathy at the recent passing of our mother & grandmother. ETHEL MEEKER & RICHARD GOHLBECK. L

For Sale or Trade

Home & Income, 5-bdrm., 2½ bath, Spanish style w/ paneled bar & den, lge. open beam living rm., covered patio, basement, plus 10 furn. units, 5 2-bdrm. & 5 1-bdrm., has \$77,000 1st T.D., owner will carry 2nd, \$152,000 or trade for property in West L.A. Hollywood, HO 4-1084. M

Acreage, 5-acre bldg. site near Rosamond, \$3450 or trade \$1500 equity for car, bal. \$1950 at \$20 mo. inc. 6% interest. Torrance, FR 8-1026. M

Train Set, transformer, track, locomotive, cars, & log loader, Lionel O gauge, \$25 or trade for HO train set. P.V. Pen., 377-5862. E

Rides and Riders

Rides Wanted

7 a.m. — 3:42 p.m.

El Segundo & Hawthorne Blvd., Hawthorne. Corine Medel, Norair, ext. 2075. E

7:30 a.m. — 4:12 p.m.

Wilshire & Bundy to Hawthorne. Jack L. Wise, Norair, ext. 1444, 479-3343. E

Rides Offered

7:30 a.m. — 4:12 p.m.

Wilshire & Bundy to Hawthorne. Jack L. Wise, Norair, ext. 1444, 479-3343. E

Campers Schedule Salton Sea Visit

The Northrop Wanderers Camping Club will hold its annual yearend campout at the Salton Sea, from December 26 through December 31.

Further information may be obtained by contacting Commissioner Frank Byers at Norair, Ext. 2669 by December 23.



TALKING COST REDUCTION — Norair's Ken Davidson (center) and Ken Hornor of the Corporate office (right) present Northrop data to a NASA team conducting an evaluation of Northrop's CMIP efforts. They are (from left) John Miller, Aubrey Smith and George Nash. Northrop passed detailed evaluation.

For Sale

House, 3 baths, 3-bdrm, large rumpus rm., 2400 sq. ft. on ½ acre lot, 4 yrs. old, located in La Habra, low down payment if buyer qualifies, Norair Credit Union, Ext. 1117. A

Pontiac, 1937 cpe., orig., \$225. Hawthorne, 678-6027. A

Playhouse, 6' x 8' redwood, shake roof, \$85. P.V. Estd., 378-3055. A

Oil Painting, 24x36, blue & white winter theme in blue & gold frame, \$35. Torrance, 371-9925. A

Wedding Dress, bouffant, size 6, \$65. Hawthorne, 671-9306. A

Honda, 1966, 305 cc, only 800 miles, \$625. Inglewood, 644-2018. A

Drafting Machine, Bruning, w/18" plastic scale, 5 yrs. old, used 1 year, \$65. Lawndale, 675-6803. A

Volkswagen, 1961, new tires, \$850. Hawthorne, 679-4237. A

Dishwasher, General Electric convt., used 6 months, \$170. Yorba Linda, 714-528-9227. A

Motorcycle Helmet, Daytona 300, full protection, cost \$30.; \$25. Canoga Pk., 340-6419. A

Electronic Equipment, Eico VTVM model 221 & Heath oscilloscope, model 0-5 w/extended range, \$50 or sell sep. Torrance, DA 6-8273. A

Trombone, Olds, 2 yrs. old, \$75. Fullerton, LA 5-9715. A

Wig, 100% human hair, dark ash blonde, blunt cut & styled, \$48. Marina del Rey, 823-2655. A

Accordion, \$100. Torrance, 326-6195. A

Corvette, 1962, 340 h.p., 4-spd., positraction, radio, 2 tops, Michelin 'X' tires, avail. in mid-January, \$2200. Lakewood, 634-8632. A

Range, O'Keefe & Merritt, 4 burners, griddle, clock & timer, broiler & storage oven, \$55. Lakewood, HA 1-5128. A

Pontiac Catalina, 1959, p/s, p/b, r/h, low mileage, 4-dr. h/top, \$550. Maywood, LU 2-1079. A

Volkswagen, 1965 sedan, r/h, s/belts, steel sun roof, 9700 miles, \$1365. Torrance, 326-5731. A

Radio, 7-transistor, brown, top grain cowhide cabinet, portable, 6 long-life batteries, \$20. Miraleste, 833-0704. A

Steve, Frigidaire, compact 30", \$40. Lakewood, 425-0164. A

Sunbeam Alpine, 1960, roadster, o/drive, new paint & tires, engine o/hailed, \$795. Torrance, 321-9225. A

Flying Club Memberships, Ercoupe, rental rate \$6.50 per hour wet, \$50. Rolling Hills Estd., 325-3057. A

Cessna 140, 1946, metal wing, 400 smoh, 1400 TT, VTR-1 Narco omniator, new battery, gen., voltage reg., 20 amp. sys., \$2800. Huntington Bch., 714-536-3217, 213-HA 9-6277. A

Power Mower, 18" Rotary, 2-cycle Clinton eng., 3 yrs. old, \$10. P.V. Pen., 378-6655. A

T-Bird, 1960, h/top, full power, r/h, good mechanical cond., \$795. L.A., 378-2302. A

Aquariums, 10 & 15 gal. w/stand for 15 gal., sub-sand & corner filters, silent, giant air pump, heaters, ceramic hull & arch, plants, gravel & fish, \$45. P.V. Pen., 375-3790. A

Austin Healey, 1957, 6 cyl., o/drive, 4-spd., wire wheels, \$575. Inglewood, 675-1664. A

Piano, spinet, Story & Clark, mahogany, orig. cost, \$1100; \$375. Inglewood, OR 7-5276. A

Parachute, 28' orange & white, new in 1963, modified to double T, also reserve parachute 24', incl. harness, \$50. Inglewood, OR 7-8301. A

Dodge Camper, 1965 Sportswagon model, low mileage, V-8 auto. trans., transis. radio, htr., anti-spin 3000 lb. rear axle, hvy. duty battery, many extras, seats 8 as wagon, sleeps 5 as camper, \$3500. Newbury Pk., 805-498-3473. A

Aircraft, 1940 Porterfield LP-65, 2 pass., 170 hrs. smoh, needs wing work, \$600. Simi, 805-526-1292. A

Corvair Monza, 1961 4-dr., auto. trans., r/h, bucket seats, \$690. Thousand Oaks, 805-495-3649. A

Pool Table, 5' x 7' table, balls, cues, triangular racker, \$45. Torrance, 326-9341. A

Cedar Chest, Lane, blonde, \$20. Wilmington, 835-3869. A

Bicycle, boy's 24" American made, \$15. Torrance, FA 8-3306. A

Baby Carriage, imported, hand-crafted, many features, \$25. Torrance, 324-5698. A

Davenport, matching chair, by Lawson, \$100. L.A., PL 5-7783. A

Skis, poles, bindings, Grevig 6'3" & boots, women's size 7, \$75. Torrance, 325-9817. A

Dodge, 1964 Polara, 4-dr. sed., 383 eng., auto., fac. air, r/h, p/s, p/b, new tires, brakes & shocks, \$1795. Canoga Pk., 340-7752. A

Home, 2-bdrm., on large fenced lot, immed. possession, low dn. pymt., \$17,500. Wilmington, FR 5-8778. A

MGA, 1958, new tires, \$500. Redondo Bch., 379-4559. A

Auto Parts for 1963 Hudson, rear end, eng. & other components, \$10. Inglewood, 672-8629. A

For Sale

Plymouth, 1959 station wagon, new tires & brakes, \$295. Gardena, DA 9-4402. A

Ford Falcon, 1962, good paint, new engine & radiator, \$550. L.A., 389-3029. A

Bookcase, small, green, antiqued, \$5. Hawthorne, 676-3883. A

Silvertone, 21" TV, w/stand, \$10. Tarzana, 345-6391. A

Helmet, Fury, w/tinted face shield, size 7¼, orig. cost \$46; \$30. Hawthorne, 676-3912. A

Ford Falcon, 1965, sprint, V-8, auto. trans., p/s, factory air cond., r/h, \$1995. Huntington Bch., 714-842-6720. A

Bicycle, 15-gear Schwinn racer, orig. price \$120; \$50. L.A., 670-6017. A

Rambler, 1965 station wagon, model 550, 3-pd., 6-cyl. r/h & w/w, take over \$86 mo. pymts., \$1299. Anaheim, 714-535-6712. A

Mustang, 1966 deluxe 2-dr., vinyl h/top, 225 h.p. V-8 w/air cond., Cruise-O-Matic trans., p/s, self-adjust. p/b, htr., radio w/long range antenna, bench seat, s/belts, w/s/w tires, wire wheel covers, 9600 miles, within warranty, \$2895. San Pedro, 831-5283. A

Sailboat, 19' O'Day mariner, keel, mahogany bulkhead, o/board, boom tent, new bottom paint, sleeps 2, \$2250. Torrance, 371-6240. A

Mustang, 1965 h/top, r/h, auto. trans., low mileage, \$2000. L.A. 837-4596. A

Movie Camera, Keystone, grip, projector 8mm. & screen, \$50. L.A., 670-6531. A

Pup, purebred German shepherd, female, 4 mos. old, shots, \$50. Canoga Pk., 341-4965. A

Tires, 2, 7.35x15 black wall, \$15. Gardena, 323-3675. A

Organ, Hammond, model B3 w/HR-40 tone cabinet, \$1600. P.V. Pen., 377-5415. A

MGB, 1964, 30,000 mi., r/h, wire wheels, tonneau cover, s/belts, \$1725. L.A., 383-4953. A

Electric Train, HO, board 4' x 8', elec. switches, 3 trains, buildings, tunnel, \$45. Hawthorne, 676-9989. A

Guitar, Gibson classical, Spanish decor, orig. cost \$150, incl. case & music, \$100. Inglewood, 671-5576. A

Aquariums, 2 5-gal. w/2 filters, dble. stem valve & pump, w/guppies, \$10. Redondo Bch., 379-8888. A

Volkswagen, 1963, sedan, w/w tires, Becker Monte Carlo radio, \$1050. Huntington Pk., 589-8746. A

Mercury Meteor, V-8 1962 2-dr. sedan, p/s, p/b, r/h, 1-owner, 45,000 miles, \$650. Pac. Palisades, GL 4-5985. A

TV, Zenith 19", portable, w/stand & remote control, \$75. Oxnard, 486-0873. A

Piano, baby grand, good quality, dk. brown, w/bench, \$395. San Pedro, TE 3-4191. A

Mobile Home, 1965, 2-bdrm., 10' x 53' Van Dyke, completely furn., cpts., dps., washer, bltins, storm windows, take over \$87 mo. pymts., \$650 needed for \$2000 equity, \$4800. Torrance, 835-6975. A

Comb. TV, stereo, radio, Magnavox, 25", walnut cabinet, 5 yrs. old, \$150. P.V. Estd., 377-3642. A

House, 3-bdrm., patios, fireplace, beam ceiling, \$28,000. Manhattan Bch., 545-6321. A

Volkswagen, 1963, 1500 sunroof, \$1050. L.A., 479-3343. A

Wonder Horse, large, \$10. Inglewood, PL 6-7337. A

Volkswagen, 1961 sedan 1300, w/s/w, radio, s/belt, 55,000 miles, \$895. Box 2501. A

Formal, full length, size 9-10, lime green, sleeveless, \$20. Redondo Bch., FR 4-8719. A

Lens, Nikkor, auto. 28mm F/3.5 for Nikon F camera, never used, cost over \$175, \$90. Box 2502. A

Oldsmobile, Holiday Super 88, 1963, air cond. & power, \$1600. Inglewood, 671-6550. A

Chevrolet, 1958 4-dr. station wagon, r/h, auto. trans., \$225. Gardena, OS 5-2159. A

Refrigerator, Kelvinator, cross-top freezer, \$55. Inglewood, 672-5798. A

Oldsmobile, 1960, r/h, p/s, p/b, \$595. Inglewood, 674-4192. A

Camera, Kodak Brownie, 35mm, \$20. Torrance, 371-6817. A

Plymouth, 1959 Fury sedan, good tires & brakes, \$350. L.A., 645-8557. A

Pontiac, 1963 Grand Prix, factory air, r/h, p/b, p/s, alum. wheels, low mileage, \$1750. Huntington Bch., 714-847-0648. A

Valiant 100, 1965, 225 cu. in., 170 h.p. Slant 6, 4-dr., auto., r/h, new Firestone 500 tires, brakes & elect. tune-up, \$1595. Redondo Bch., 371-9724. A

Airplane, Bonanza C-35, TT 1500 hrs., 700 smoh Narco MK10, M12, MBT & Lear ADF 12E2, 20-gal. aux. tank, air cond., oxygen kit, many other extras, \$13,000. Gardena, 329-4171, 329-5103. A

Chevelle, 1964 Malibu S.S., 283 cu. in., Power Glide, p/s, oval astros & locking knock-offs, new tires & bat., Motorola solid state vibrasonic, \$1800. Gardena, 329-4765. A

Honda, S-90, 1-yr. old, dual mirrors, lug. rack, helmet, tool kit, cost \$450; \$300. San Pedro, TE 3-4272. A

Oval Rug, braided, 11 x 14, shades of green & brown, just cleaned, \$30. Lynwood, 632-8696. A

Oldsmobile, 1960, Super 88, p/s, p/b, \$450. Lawndale, 675-2305. A

For Sale

DeSoto, 1960 2-dr. h/top, Adventurer, full power, incl. windows, \$595. Harbor City, 262-1856. A

Boat, Evinrude Sport 16, 1965, 90 h.p., fully equipped, Velmar water skis, Evinrude trailer w/elec. brakes, take over approx. \$70 mo. pymts., \$2600. Norwalk, 864-9661. A

Lot, lge., 180° unobstructed view of ocean, in P.V. Estd., \$1000 dn. or more at option of buyer, will carry bal. at 6%, \$12,000. Rolling Hills Estd., 377-0146. A

Table, 6' portable, Samsonite, \$30. Anaheim, 776-1322. A

Rug, 12½ x 19, green wool, \$50. L.A., GR. 4-7895. A

Oldsmobile Engine, 1956, new rebilt., bored 371 cu. in. dual quads, alum. valve covers, \$250. Norco, 737-1081. A

Home, deluxe custom on 1/3-acre, 3-bdrm. & family rm., 2-bath, 620 sq. ft. covered patio, cust. rock fence & drive, room for horses, \$37,950. Santa Ana, 532-2691. A

Organ, Thomas, electronic transistorized Serenade, ebony, matching bench, 2 keyboards, 25' pedals, Leslie speaker plus 3-12" speakers, 3 yrs. warranty on tone generators, many extras, terms, cost \$2100; \$1099. Hawthorne, 679-4365. A

Tape Recorder, 4-track stereo record. & playback, 2 microphones, & stands, Silver-tone Medalist, \$150. Buena Pk., UN 3-2769. A

House, 3-bdrm., fireplace, dining rm., sun porch, dble. lot, heated pool, large walled patio, 24x24 detached rec. room, w/bar & fireplace, dble. gar., dble. parking apron, 15 min. to Northrop, \$37,500. Manhattan Bch., 374-8744. A

Shopsmith, Mark V, all standard acces., plus jointer, \$180. Torrance, DA 3-1026. A

Water Softener, Cal-Ever, used 6 mos., \$250. Lakewood, 867-0855. A

Pups, German shepherd, silver grey, \$60. Malibu, GL 7-2688, GL 7-7621. A

Pool Table, 3½ x 7', complete set of balls, 3 cue sticks, rack, \$65. Manhattan Bch., FR 2-6916. A

Chevrolet, 1964 Bel-Air, 4-dr. sedan, r/h, w/s/w tires, auto. trans., 283 cu. in. eng., 21,867 miles, \$1200.

Tom Flannigan Appointed Vice President

Thomas E. Flannigan, a Northrop Corporation employee since 1953, has been named vice president of Marketing and Planning in the company's Ventura Division.



Mr. Flannigan

The appointment, announced by George F. Douglas, Corporate vice president and Ventura general manager, became effective December 1. Mr. Flannigan will also continue to serve as a manager of the Marketing and Planning department, a position he has held since December 1964.

Mr. Flannigan, born in Santa Monica, attended Santa Monica City College from 1939 to 1941, and joined the U.S. Marine Corps in 1942. After four years of service, he joined Dun & Bradstreet until 1950, when he was recalled for two additional years of active duty. He resigned from the Marine Corps in 1952 with the rank of major.

In 1952 and 1953, he attended Loyola University, majoring in business administration. He then joined Northrop as Military Relations representative. From 1957 to 1960 he was assigned to the Washington office of Northrop.

In 1960, he joined Northrop Ventura as director of Defense Marketing. He was appointed manager of Marketing and Planning in December 1964.

Mr. Flannigan is a member of the Navy League, American Management Association, Air Force Association, Association of the U.S. Army, and the Congressional Country Club. He, his wife, and two sons, live in Encino.



LAST-MINUTE SHOPPING for Christmas will be a painless job this year for J. R. (Andy) Andrews of Northrop Ventura. Mr. Andrews (center) received a \$314 check from Johnnie Via

of Industrial Relations for a suggestion he made on the manufacture of a part for the RP-76 target drone. At left is Ralph Friesen, RP-76 project manager.

Plastics Worker Hired Following Training Course

A Port Hueneme man who recently completed a federally-sponsored machinist training course has been hired by Northrop Ventura as a plastics worker.

Enrique Avila, married and the father of seven children, was hired after completing the most recent six-week course sponsored under the Management Development Training Act (MDTA), in cooperation with the Ventura Unified School District.

He is the sixth MDTA trainee to be hired by Ventura, Personnel representative Johnnie Via said.

Mr. Avila attended Oxnard High School until joining the U.S. Air Force in January 1959. He completed his high school education while in the Air Force, and was honorably discharged in November 1962.

HOLIDAY IN SYDNEY

Years, Miles Disappear In Cruise to Australia

Forty years and 8,000 miles separate Northrop Ventura's Mina Carr from her brother and sister in Australia. She hasn't seen either since the three were children in their native Scotland.

But the years and the miles will disappear next week when Mrs. Carr and her husband, Bill, a lead-



Mrs. Carr

man in Ventura's Time-keeping group, arrive in Australia on a trip they have been planning for 15 years.

The Carrs met in Canada, where Mrs. Carr — then Miss Mina Muir — emigrated as a teenager. They were married, and later moved to California. Both have worked at Ventura for 10 years.

Mrs. Carr's brother, Samuel Muir, left Scotland and moved to Brisbane, Australia. Her sister, Mrs. Ruth Roughead, lives in a suburb of Sydney.

After saving their money since 1951, the Carrs decided this year to make the trip, and they arranged for a six-month leave of absence.

On December 4, they boarded the S.S. Mariposa on a cruise which will take them to Tahiti, New Zealand, Australia, New Caledonia, the Fiji Islands, Samoa and Hawaii, before returning in April.



Mr. Carr

Mrs. Billie Linebarier, who works with Mrs. Carr in General Accounting, said the couple elected to travel on a "first class" basis throughout the trip.

"They decided a long time ago that they wanted to do it that way," Mrs. Linebarier said. "They knew it would cost more, but they had been planning this for so long that they wanted to go first class all the way."

The Carrs arrived in Tahiti on December 14 and spent several days there. The ship was due to arrive in Auckland, New Zealand, today, December 21.

Next Monday—the day after Christmas—the Mariposa will arrive in Sydney, where Mrs. Carr's brother will meet her.

"Bill and Mina will tour Australia extensively from their arrival until they leave, around the beginning of April," Mrs. Linebarier said.

"Her brother made the arrangements for their travel while in Australia. They plan to fly from city to city, spending some time on the Gold Coast and around the islands near there."

The return trip will take the Carrs to new Caledonia on April 2, the Fijis on April 4, Samoa on April 5, and Honolulu on April 10.

RP-76 Idea Earns \$314 For Andrews

J. R. (Andy) Andrews, Northrop Ventura Manufacturing supervisor, has an extra \$314 to take care of last-minute Christmas shopping—and Ventura has saved 10 times that amount, thanks to Mr. Andrews.

Mr. Andrews earned the money through a suggestion he submitted on the manufacture of a part for the RP-76 target drone. It was estimated that his idea has saved the company \$3,144.60, and he was awarded 10 percent of that amount.

He had suggested that aluminum sheeting for the RP-76 guidance section be purchased, and then rolled into tubing form and seam welded.

Formerly, .44-inch thick aluminum tubing was purchased, and was being machined to bring the thickness down to .080 of an inch.

"This is a very hard and long machining job," Mr. Andrews said in his suggestion.

The idea was adopted, and it was discovered that the new procedure saved one hour of work per part manufactured.

Material savings were even greater. Where the tubing cost \$17.63 per part, the aluminum sheeting cost only \$3.16, for a total saving of \$14.47 per part.

Since 180 parts were included in the operation, it was estimated that the total material savings amounted to \$2,604.60, and the manpower savings totaled \$540, for the net saving of \$3,144.60.

Ventura's Steman Wins Election as Association Chief

John P. Steman, supervisor of Plant Protection for Northrop Ventura, has been elected president of the 300-member Ventura County Air Force Association.

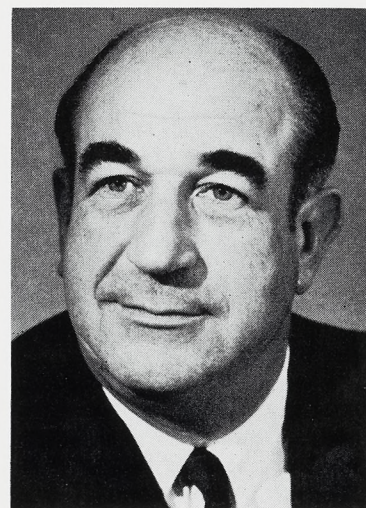
Mr. Steman, a member of the group for four years, was installed on December 9 at a dinner at Oxnard Air Force Base, where the group meets.

Membership is open to all U.S. citizens with an interest in the Air Force and its activities, Mr. Steman said.

Group members take several trips to Air Force Installations each year.

Next month, the group will visit the Air Force Combat Operations Center in Phoenix.

Before joining Northrop Ventura nearly five years ago, Mr. Steman was an Air Force major.



CHRISTMAS ON TELEVISION

Skater to Receive 'Biggest Present'

Kristine Olson, 14-year-old daughter of Mrs. Eunice Olson of Northrop Ventura's Aero Instruments Facility, will receive her biggest Christmas present at 10 p.m. on Christmas Day.

That's when she'll see herself,

along with 23 other youthful ice skaters, on NBC Television's Andy Williams Show.

The skaters will perform as a background for Peggy Fleming, 1966 World Figure Skating champion, who will be Mr.

Williams' featured guest.

Miss Olson, a member of the United States Figure Skating Association, has been skating for eight years, and has won several trophies in competition with other girls in her age classification.

Her mother is Material coordinator at Aero Instruments, a Ventura subsidiary in North Hollywood. She has been employed by Ventura for 11 years, and has worked at Aero Instruments for two.

The show was taped at NBC studios in Burbank on December 2. A portable ice rink was set up for the special Christmas show.

Miss Olson, a sophomore at Pinecrest Preparatory School in Woodland Hills, is a member of the Skating Club of Van Nuys, the Los Angeles Figure Skating Club and the Pickwick Center Skating Club.

The Olsons live in Van Nuys.

Kristine's maternal grandmother, Mrs. Jean Kaupp, was a long-time Norair employee until her retirement in January.



CHRISTMAS WITH ANDY WILLIAMS will keep 14-year-old Kristine Olson close to the family's television set. She is one of 23 youthful ice skaters to appear on the singer's show.

Canadians Meet, List Parts Needs

Twenty representatives of the Canadian government's Materiel Command (MATCOM) have concluded a two-week conference at Northrop Norair on spare parts requirements for the Canadian version of Northrop's F-5.

The men—both military and civilian personnel—were from MATCOM headquarters in Ottawa, Ontario, the Canadian capital. The meeting began on November 28 and continued through December 9.

In establishing their spare parts requirements, the men reviewed documents prepared by Norair's Logistics section. The requirements were established to support the operational program for the CF-5 aircraft.

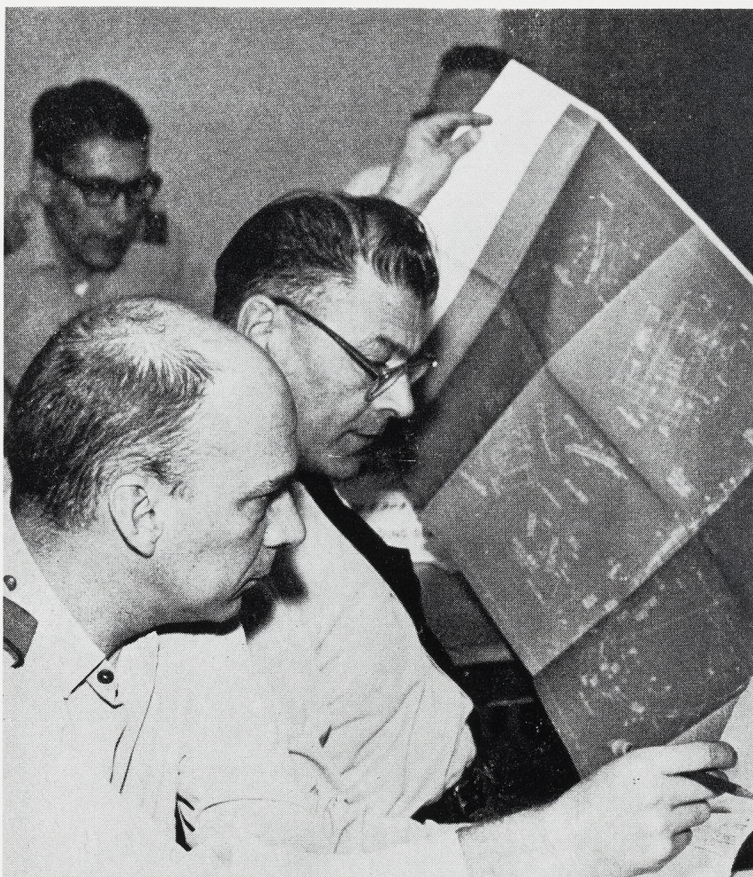
The conference was the second held at Norair on the CF-5. The first, from September 19 through 22, emphasized requirements on "high value" and long lead-time spare parts and aerospace ground equipment.

"The provisioning conferences were held in stages," according to Tom Lancaster, supervisor of Norair's Logistics Documentation group, "because of the limited lead time we had to work with."

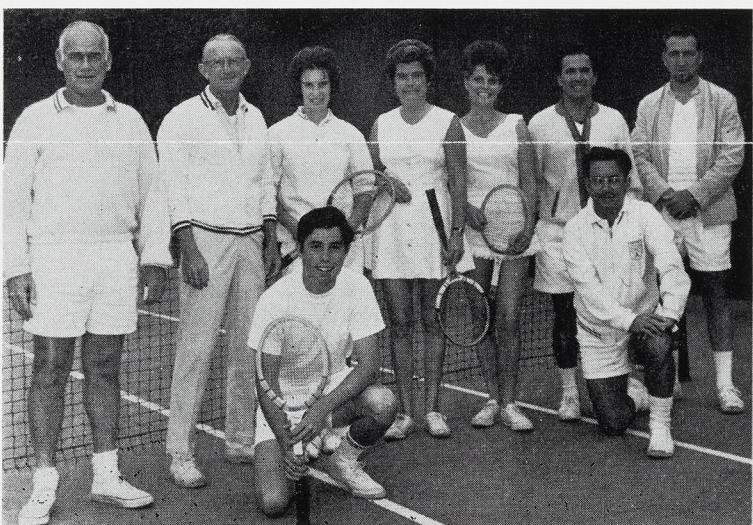
Mr. Lancaster coordinated both conferences. Chairman for the first meeting was MATCOM's Alex Milne. Carl Bourgeois chaired the second conference. Norair's counterpart for the September session was Jack Nation, and Gabe Sady for the second.

In all, eight Norair men worked with the Canadians during the conference, making support recommendations for spares orders.

The Canadian version of the F-5 is being built by Canadair of Montreal, under license to Northrop.



PLANS OF THE CF-5 are studied by Flight Lieutenant G. L. Lees (left) and Flight Lieutenant E. F. Pearson, both of the Royal Canadian Air Force. The men were among 20 Canadians studying CF-5 parts requirements in a two-week conference recently at Northrop Norair.



TENNIS TRAVELERS—Although 85 NRC tennis enthusiasts journeyed to La Jolla for a weekend of fun, only a few could be found at one place at any given time. This group, snapped on the courts, include (left to right) Jim McKanna, John Potts, Dorothy Neatour, Dorothy Milne, Maxine Lewis, Floyd Hraný and James Nimeshein. Kneeling, Mike Reed and Russ Black.

Traditional Holiday Nears; Trips and Parties Planned

(Continued from page 3)

Bowlers will try for strikes at an all-Northrop Christmas tournament December 30-31 at Gardena Bowl.

Over the past weekend, the emphasis was on the young at two NRC-sponsored children's parties held in Hollywood and Anaheim.

Antelope Valley employees held their annual children's party December 18. And on December 17 Norair's Palmdale adults met for their annual dance, while across town those from Edwards Air Force Base were tripping the light fantastic at the Sands Bowl, scene of their annual dance.

Northrop personnel at NASA's Ames Research Center, Mountainview, joined their NASA friends at a children's Christmas party December 17.

December 17 was also "children's day" at Huntsville, Alabama, when Northrop families feted the youngsters. This was followed by a December 21 dance for adults at the Officer's Club at a local installation.

Amid the many last-minute details, all employees are urged to spend a few minutes preparing for the long absence from work. Take down decorations, unplug electrical appliances, typewriters and other potential hazards.

\$3 MILLION CONTRACT

Nortronics to Produce C-5A Computer Systems

A contract for approximately \$3 million has been awarded to Northrop Corporation by the Lockheed-Georgia Company, Marietta, Georgia, for airborne computers for the U. S. Air Force C-5A military transport airplanes.

Northrop's Nortronics Division will produce the 67 computers at its Hawthorne facilities. The computers will be used in the Lockheed-designed Malfunction Analysis Detection and Recording (MADAR) system which will monitor all major C-5A systems.

The Nortronics computers are extremely lightweight, but have all the computational capability of large data processing machines.

Earlier this year, Northrop received a contract from Lockheed-Georgia for the development and production of the C-5A inertial-doppler navigation equipment. The C-5A will be the first cargo plane to com-

bine both doppler and inertial systems. Included in this system will be Nortronics airborne computers, similar to those that will be produced under the MADAR award.

Nortronics also is providing integration of all elements of the aircraft guidance system under contract to Lockheed-Georgia.

Radio Club to Offer Morse Code Class

Northrop Radio Club will launch a new series of classes in Morse code and radio theory immediately following a brief business meeting set for 5 p.m., January 9, at NRC Clubhouse, Hawthorne.

Nilan Kincaid, ext. 1631 at Norair, will instruct the sessions aimed at aiding those interested in obtaining either novice or general class amateur operator's licenses from the Federal Communication Commission.

POLARIS PROVIDES BACKGROUND

Poseidon Meets Schedule

Reliability, design flexibility and production experience.

These are the ingredients contributing to the on-schedule progress of Nortronics' checkout equipment for the Navy's Poseidon missiles.

Engineers at Nortronics' Anaheim facility are developing a new Missile Test and Readiness Equipment System similar to that designed for Polaris A1, A2 and A3 missiles.

"Thanks to our previous experience with Polaris, we're making good progress with the Poseidon system," said Program Manager Daniel T. Chung. "And this is in spite of the fact that the new system must monitor a unit several times more complex than Polaris."

Nortronics' present success goes back even farther than 1959—the date the first Polaris missile checkout equipment was delivered to the Navy.

In 1957, a company-funded research program resulted in the design of DATICO (Digital Automatic Tape Intelligence Checkout). DATICO was conceived as an expandable building block on which any number of test and monitoring systems could be built.

The concept was proven sound when the Navy asked Nortronics to build a checkout system for the first Polaris missiles. Called the Type C, it was designed, built and delivered in the short span of five months.

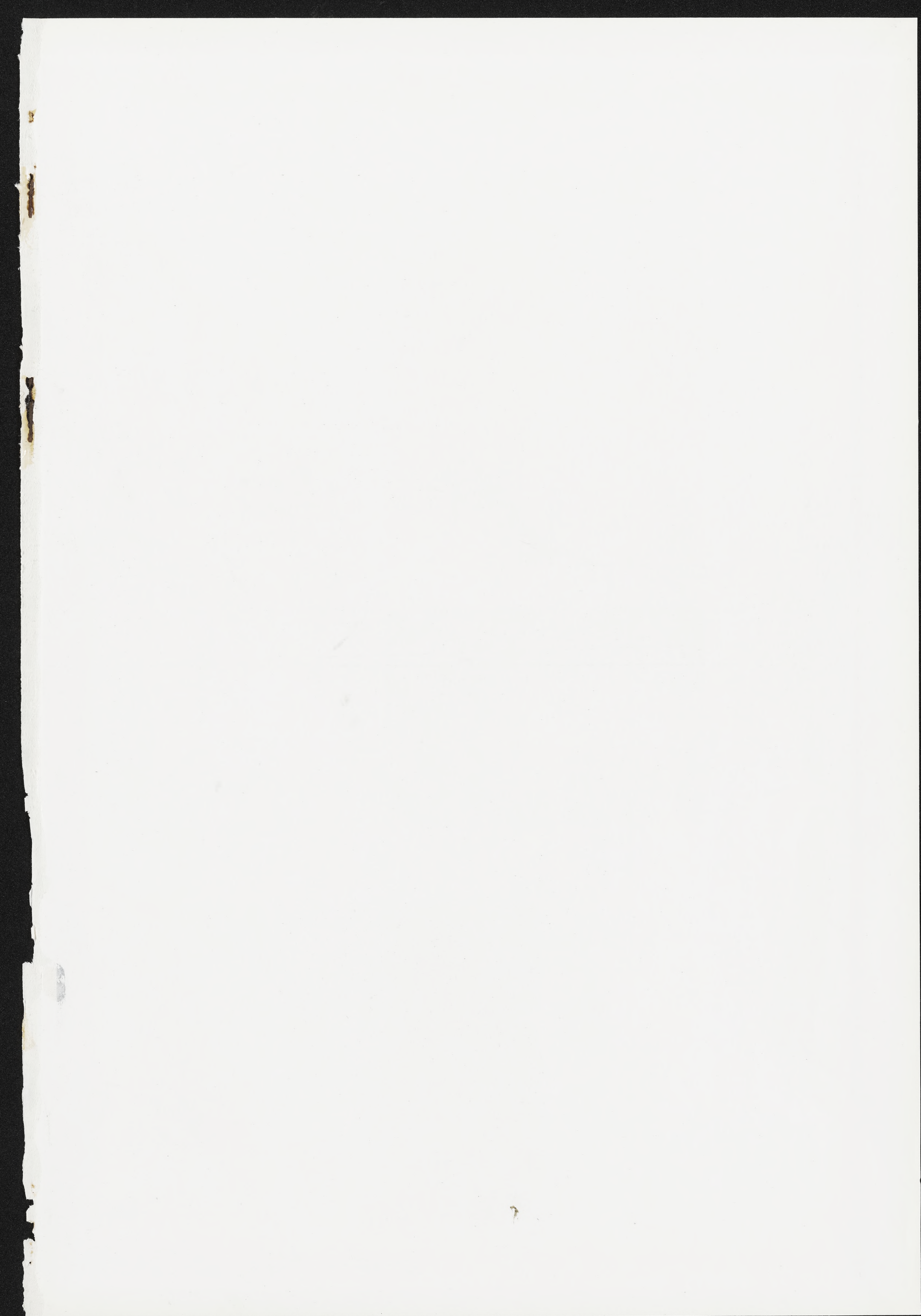
From this system grew the integrated logistics of the Polaris program. The same basic test equipment is used to check the missile throughout its existence—from factory to submarine to supply tender to maintenance depot and back to the submarine.

"This approach," said Mr. Chung, "insures high standards of operational readiness."



EXAMINING SOME OF THE WIRING components of the Door Mounted Junction Panel for the C3 Poseidon MK 2 and MK 3 monitoring system produced and designed by Nortronics are Daniel T. Chung, Polaris/Po-

seidon program manager, and Maurice A. Seeley, chief, Electronics Assembly and Test. (L. to R.) Elsie Banion, wiring assembler; Genevieve M. Hannah, wiring assembler; Mr. Chung and Mr. Seeley.



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